

AMERICAN DENTAL ASSOCIATION

NOVEMBER 1961

*a selection of world dental literature*

# dental abstracts

VOL. 6 NO. 11





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## dental abstracts

NOVEMBER 1961 • VOLUME 6 • NUMBER 11

FRONT COVER: Kodachrome photographs of oral conditions of 19 year old girl after gingivectomy. See article by Swenson on page 657

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## news and notes

George C. Paffenbarger, senior research associate of the American Dental Association at the National Bureau of Standards, and a member of DENTAL ABSTRACTS' board of consultants, submitted the following comment on the abstract of an article from the *British Dental Journal* relating to "Cadurit," a new direct filling resin (see under dental research, dental materials):

"'Cadurit' has all the faults of the current direct filling resins plus a very high expansion on sorption of water, and clinical trials of 'Cadurit' should be done on a research basis only."

Donald A. Wallace, an editorial consultant to DENTAL ABSTRACTS, comments as follows on the paper by Carvel and others, abstracted in this issue (see abstract in section on dental research, therapeutics):

"This paper is of interest as a scientific contribution, but it leaves much of importance unsaid. The oral hygiene status of the subjects is not described; it is not stated whether local predisposing conditions (such as faulty margins and unrestored caries) were present, and laboratory tests for vitamin C deficiency are not mentioned. Thus it is not clear whether the medication would have been necessary if all predisposing factors had been eliminated."

The Malayan Dental Association has published the first issue of its new publication, the *Malayan*

*Dental Journal*, in English. The association was organized in 1938, with E. K. Tratman as the first president. The Dental School, founded in 1927 as part of the King Edward VII College of Medicine, has been part of the Faculty of Medicine of the University of Malaya since 1949. The degree of B.D.S. is awarded those who complete the five-year course.

### Comments on new format

Following are excerpts from letters in which readers comment on DENTAL ABSTRACTS' new format:

"The new format of DENTAL ABSTRACTS is most interesting and attractive. . . . I like the novel manner in which you have sectionalized the abstracted information. It will make it easier for dentists to locate information of specific interest."  
—J. J. Nevin, president, Coe Laboratories, Inc., Chicago

"The magazine is more practical than heretofore."  
—G. E. Cox, Wilmington, Del.

"The format is excellent. As an expression of the modern graphic arts, it should rate you a great big solid gold star. Every dentist able to read and understand English should pay increasing attention to your new DENTAL ABSTRACTS."  
—A. P. Peyraud, vice-president, Coe Laboratories, Inc., Chicago

"Your new format is very fine and you certainly have used the illustrations to an excellent advantage."  
—A. Porter S. Sweet, editor, *Dental Radiography and Photography*, Rochester, N. Y.



# objective roentgenographic examinations of patients with periodontal disease

The intraoral roentgenogram permits accurate diagnosis of pathologic changes in the periodontal tissues by showing the various stages of absorption of the hard tissues in the form of graded shadow intensities. These roentgenographic changes may appear as variations from the normal picture, but no conclusion should be drawn as to the characteristics of a pathologic process.

For these reasons, the use of the terms "horizontal atrophy" or "vertical atrophy" should be avoided. Based entirely on the changes revealed by the roentgenogram, the terms "reduction in height" and "lateral resorption" are more appropriate.

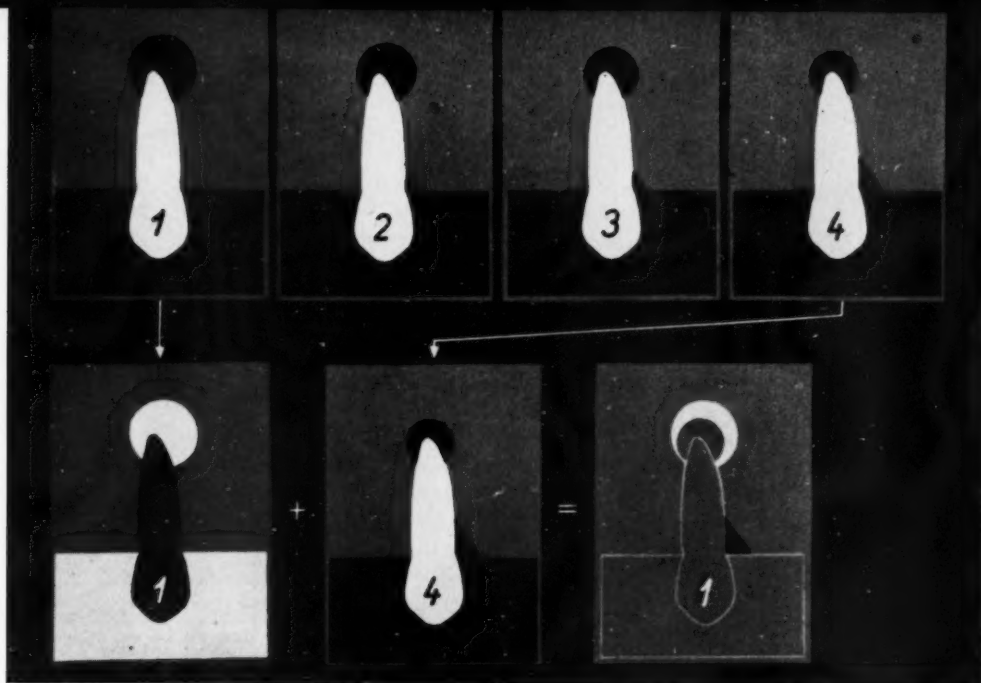


Figure 1 (Above) Use of identical roentgenographic technique. 1 = original. 2 to 4 = control. Below, left = positive of original roentgenogram. Below, right = superimposed roentgenogram shows apposition in apical area and resorption in cervical area. Figure 2 (Below) Identical roentgenograms. Above = original. Center = control. Below = superimposed.





Figure 3 Resorptive process after apicoectomy. Left = original. Center = control. Right = superimposed

Figure 4 Intraoral roentgenogram shows reduction in height of the cervical crest in the bicuspid region



If the cervical crest or the interdental septum is shortened apically, there exists a definite reduction in height. Resorptive changes along the roots, however, constitute lateral absorption.

The bisecting-angle technic of taking a full mouth roentgenogram of a patient with periodontal disease has the following disadvantages: (1) the vestibular and oral portions of the alveolar crest appear insufficiently differentiated, except in instances of advanced periodontal disease; (2)

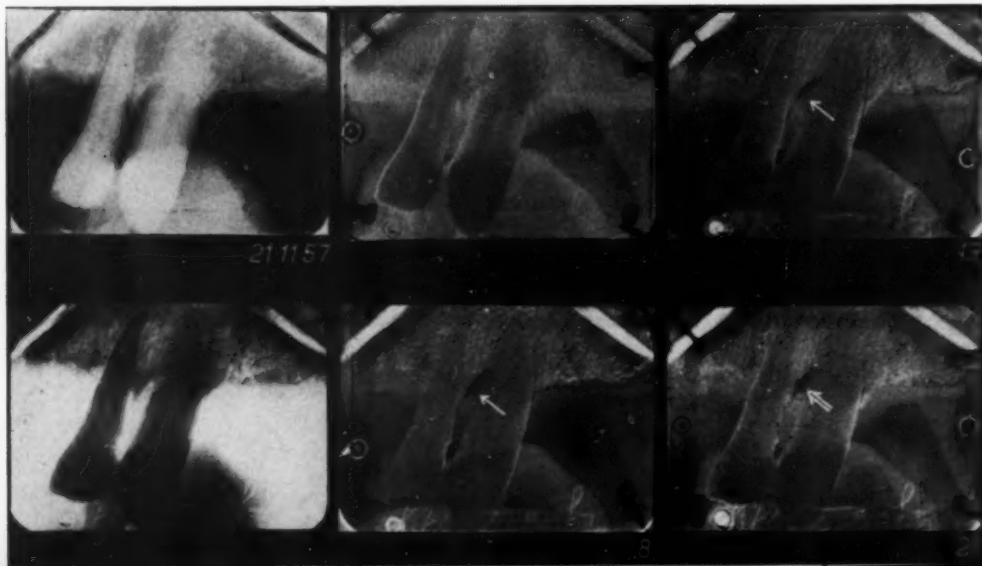
the involved tissues are partially concealed by a constant cervical translucency, and (3) the oblique central ray causes dimensional distortions to a varying degree. These factors frequently cause diagnostic errors which can be avoided by the use of the paralleling technic. This diagnostic procedure leads to elimination of disturbing translucency and brings the central ray at right angles to the long axis of the tooth, thereby permitting better reproduction of all details by revealing the relationship between tooth and bone in craniocaudal and mesiodistal dimensions.

Insignificant resorptive changes which cannot be detected in conventional roentgenograms become apparent when identical control films and the paralleling technic are used. These roentgenograms, however, have to be evaluated and interpreted by a special method.

The use of a filmholder consisting of two parts and an impression compound container is recommended. The taking of a compound impression of the teeth in the region to be investigated enables the dentist to repeat the roentgenogram in the identical relation between teeth and central ray by using the stored impression when repeating the exposure and inserting a guiding rod into the container.

Objective roentgenographic evaluation is made by superimposing the original (positive) roentgenogram over the control (negative) roentgenogram. This diagnostic method is based on the fact that the "grey values" of both roentgenograms will cancel each other in the areas in which no pathologic changes have occurred, whereas light

Figure 5 Control roentgenograms showing resorption in interdental area



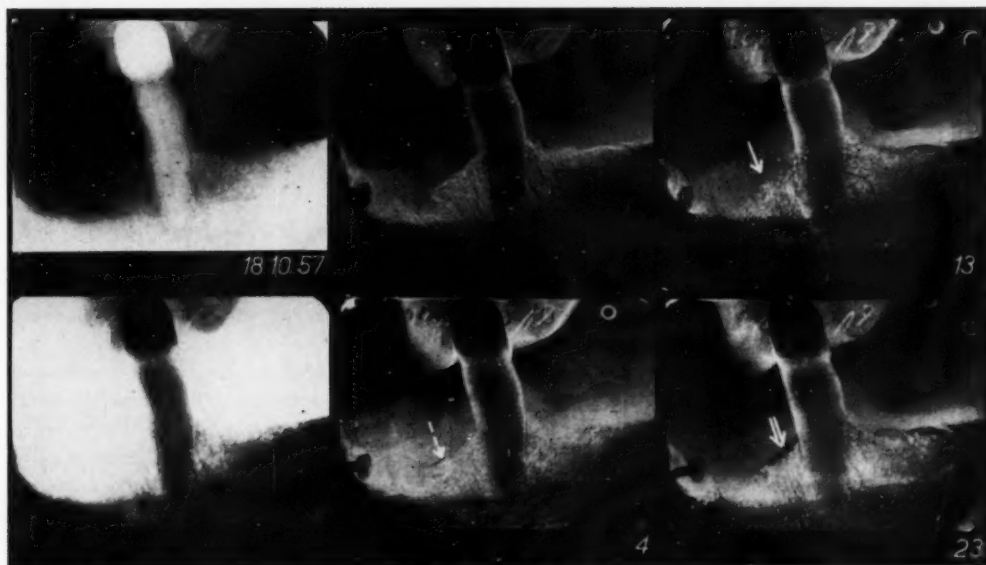


Figure 6 Control roentgenograms showing cervical resorption

or dark patches appear in the regions in which definite pathologic changes have taken place.

Mathis, H., and Hielscher, W. Dental Clinic, Free University of Berlin, Assmannshauser Strasse 4-6, Berlin-Wilmersdorf, Germany. *Objektive Röntgenologie bei Parodontopathien.* Zahnärztl. Praxis 11:241-242 Nov. 1, 1960

#### Etiology of periodontal breakdown and its prevention

Recent studies in the Department of Dental Science of the Royal College of Surgeons on the histopathology of periodontal breakdown have led to a new hypothesis. The studies proved that, when two teeth are in contact, the structure that in the past has been described as an interdental papilla (Fig 1, P) is not a papilla. Its top edge is not convex but forms a concave ridge or col (Fig. 2, C), a depressed ridge between two peaks. The peaks are formed by the buccal and lingual (L) papillae; the ridge that runs between them dips down below the contact area (CA) of the adjacent teeth. The contact area is more extensive than the term "contact point" CP suggests.

An even more significant finding is that,

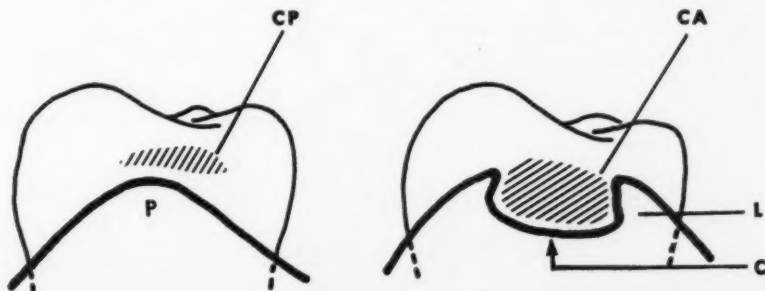
whereas the buccal and lingual papillae are covered by ordinary oral epithelium of the keratinized, stratified squamous variety, the sloping sides of the col where they fall away from the ridge are covered by an entirely different kind of epithelium. It is a vestigial structure and consists of the epithelial remnant of the enamel organs of the two adjacent teeth (Cohen, 1959).

As a person grows older, this vestigial enamel epithelium gradually is replaced by well-keratinized, stratified squamous epithelium, derived from the buccal and lingual papillae. This process may be interrupted by ulceration, however, whereupon severe interdental periodontal breakdown may occur.

There is no free interdental space between teeth that have recently erupted in contact. The interval between the teeth is entirely occupied by

Figure 1 Left

Figure 2 Right



tissue that is in biologic continuity with the interproximal surfaces of the adjoining teeth.

Histologic evidence supports a hypothesis that the epithelial remnant of the enamel organ is both physically and biologically incapable of providing adequate protection as a surface covering for the deeper tissues. From this, it follows that when the epithelial remains of the enamel organ are exposed to the surface, the underlying connective tissue becomes inflamed.

Apparently there are two distinct anatomic arrangements of the tissues that form the interdental septum, and each exhibits its peculiar response to irritation. There are, accordingly, four possibilities to be considered: (1) the center of the col may still be covered with enamel epithelium; (2) the enamel epithelium on the crest of the col may have been replaced by stratified squamous epithelium; and in each of these conditions, the col may be (3) clinically healthy or (4) clinically inflamed and ulcerated.

Clinically healthy col covered with enamel epithelium is found only in adolescents or young adults. It appears to be a transient stage during which the col is undergoing re-epithelization. If this process is unduly delayed, there is danger that the center of the col will become ulcerated and most of the enamel epithelium destroyed.

Treatment at this stage should be confined to maintaining the health of the oral epithelium covering the buccal and lingual papillae, thereby strengthening its attachment and encouraging it to grow through the interdental space and cover the col with stratified squamous epithelium as soon as possible. This can be done by brushing the gingival margins regularly and carefully. If there is any tendency toward detachment—that is, if the papillae are inflamed and there is bleeding when the teeth are brushed—the gingival margins must be brushed only toward the occlusal surfaces of the teeth. At this stage, it is wrong to allow a young patient to use floss silk because it can easily detach the enamel epithelium from the tooth, and because it serves no useful purpose, since there is as yet no gingival sulcus between the teeth to be kept clean and no stratified squamous epithelium to be kept keratinized.

Dental students and hygienists should be warned that they must never attempt to scale between the teeth at this stage of development; in

fact, they should not be allowed to pass anything between the teeth below the contact point. If they do, they will detach the papillae from the col.

Once the col is detached from the teeth, it becomes acutely inflamed and rapidly breaks down, establishing a deep interdental ulcer that has little chance of healing without surgical intervention.

If an ulcer develops, the buccal and lingual papillae may be sutured together across the ulcer. A small curved needle carrying a silk suture is passed through the base of the buccal papilla, on through the interdental space and out through the base of the lingual papilla. The needle is removed, and the needle end of the suture is snapped between the contact points of the teeth; the suture is tied off on the buccal side to make the knot accessible, or absorbable suture may be used.

As an alternative, a dressing may be used in a manner that will hold the buccal and lingual papillae in place over the ulcer. This is not easy to do, however, and unless the papillae are sutured in place, usually it is better to cut them away, leaving a somewhat flatter interdental septum and a clearly accessible interdental space.

The child must be taught some method of keeping the interdental spaces clean and the new stratified squamous epithelium, which covers the healed col, well keratinized. Floss silk, carefully used, is common for this purpose. Some young patients can be taught to make toothbrush bristles do this work, and others may have large enough spaces to use wood points, especially if the patients can be persuaded to thin down the wood points.

When the interdental septum has become re-epithelized with stratified squamous epithelium, it is no longer liable to the rapid, almost catastrophic, breakdown that may occur when there is only enamel epithelium present. The only treatment of the healthy col, once it is re-epithelized, is regular scaling to insure that there is no calculus deposited in the sulci, and the use of twisted floss silk, wood points, or a special toothbrush drill to maintain firm keratinization of the surface.

Fish, Sir Wilfred. Royal College of Surgeons, London, England. Etiology and prevention of periodontal breakdown. *D.Progress* 1:234-247 July 1961

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dental practice





## Prosthodontics

### Control of gagging through suggestion

Gagging related to dental treatment falls in the same category as fear of the dentist and apprehension at dental treatment. All three occur involuntarily and can be overcome by conditioning through conscious suggestions and hypnosis. Gagging is most apt to occur during the taking of intraoral roentgenograms, the taking of impressions, and the initial wearing of dentures or orthodontic appliances.

The techniques employed in overcoming gagging or retching are based on proper dentist-patient relations. Semantics also plays an important role. Before the commencement of any dental operative procedure, the dentist should establish rapport with the patient by portraying kindness, patience and understanding. The patient should be enlightened as to the procedure which is to be undertaken, and the practitioner should project confidence and assurance.

The dentist should not place too much impression material in the mouth, or too many instruments. He should instruct the patient to breathe in and out, and should pace the breathing. The patient should be complimented during the procedure. The dentist should avoid touching sensitive trigger spots. All saliva should be removed, and the dentist should avoid prolonged retention of instruments or substances in the mouth, and should never show anxiety. Positive words should be used, which will not trigger negative reactions.

For instance, the procedure in taking intraoral roentgenograms is as follows. The dentist says: "I am going to take some x-rays of your teeth. I will place this film in your mouth and you will relax while the picture is being taken."

If the patient reacts by retching or gagging, the dentist says, "Let me show you how you can overcome this yourself." The dentist then has the patient clasp his fingers together and convinces him that he cannot take his fingers apart. Then the dentist says, "I did not hold your hands, you did it yourself just with your own mind. Now you can

stop gagging. When I put this in your mouth just relax, breathe in and out nicely, and breathe deeper and faster to feel better."

Almost invariably, the foregoing technic suffices to overcome retching and gagging when taking impressions or roentgenograms. If the patient does not respond to this technic, then trance induction is pursued until the patient is hypnotized, and posthypnotic suggestions are given to negate retching or gagging.

If the patient says, "I vomit every time an impression or x-ray is taken" the dentist replies, "We have a new method to overcome this." During the entire procedure, the dentist should compliment the patient as follows: "You are doing nicely, you are a very good patient, breathe in and out, and in a moment or two we will be finished." The breathing pace can be regulated by suggestion, depending on the patient's reaction. If there is any sign of retching, the breathing should be paced more rapidly as that in many instances will overcome the retching reflex.

The successful management of the patient who anticipates trouble wearing a denture or orthodontic appliance is based on proper indoctrination. No patient should be given a prosthetic appliance without proper instructions relating to insertion, speech, the degree of discomfort he may experience, and care of the appliance. Some time should be spent with the patient to teach him how to articulate speech. The paramount appeal to every patient is esthetics, comfort, better function and speech.

Stolzenberg, Jacob. 512 Seventy-first Street, Miami Beach, Fla. Technique in conditioning and hypnosis for control of gagging. *Int.J.Clin.& Exper.Hypnosis* 9:97-104 July 1961

### Value of esthetics in complete denture service

In this modern and scientific era of dentistry, edentulous patients require a complete denture service that not only restores masticatory and phonetic functions but also improves facial expression and appearance. Unfortunately, many complete dentures fail to accomplish the desired physiognomic rehabilitation.

In regard to esthetics, the accurate reproduction of the anatomic features present before the patient became edentulous seems to be the main

goal. In many instances, no exact data or satisfactory clues as to the appearance of the normal face and dentition are available. The patient's idea of how his dentures should look usually are incorrect. This idea may not be in accord with the fundamentals of denture esthetics—the previous state of the dentition or the age and sex of the patient.

The public has come to realize the values of esthetic complete dentures. This realization has created a specific demand for more intensive research designed to solve the problem.

Before an attempt is made to achieve reproduction of the natural and pleasing appearance of the face through insertion of complete dentures, it is essential for the dentist to study the facial landmarks such as form and size of the anterior aspects from the forehead to the chin, the proportion of the face in relation to the eyes, ears, nose, cheeks and mouth, the form of the facial profile and outline, the shape and size of the mouth, the thickness, curvature, prominence and tenseness of the lips, the form of creases and folds in the facial tissues, the position (squinting) of the eyes, the shape and dimensions of the nostrils, and the over-all facial appearance at present and in the past. This can be done by considering carefully pictures of the patient before he became edentulous.

Restoration of the lower lip contour often is a difficult, especially in patients in whom extreme resorption of the ridges has taken place. This problem may be solved satisfactorily by inserting acrylic material into the adjacent parts of the lower denture (in the region between cuspid and second bicuspid, near the occlusal plane). This procedure will result in a bulgelike shape of the denture borders. In order not to affect the shape of these borders significantly, the acrylic bulge, preformed in the final impression, should not be extended too far. If the bulge is positioned near the occlusal plane, it will not interfere with the retention of the lower denture, nor will it become visible even when extreme movements of jaws and lips are carried out.

The two types of teeth which express best the significant characteristics of the age and sex factors are the lateral incisors and the cuspids. In women, therefore, the mesial portion of the lateral incisors should be positioned slightly labially, or placed to overlap the distal parts of the central

incisors. Such an alignment will result in an esthetic, young and feminine appearance of the patient's face and teeth.

To emphasize male characteristics, a straight arrangement of all anterior teeth seems to be desirable. However, to interrupt the often monotonous straight tooth line, it is advantageous to position the mesial edges of the lateral incisors behind the distal edges of the central incisors, or to rotate the lateral incisors slightly.

In women and men, these characteristic tooth positions can be varied to suit best the individual patient's physique and peculiarities, thereby obtaining a harmonious and esthetically satisfactory prosthodontic result.

Olthof, A. University of Groningen, Antonius Deusinglaan 1, Groningen, The Netherlands. Enkele esthetische aspecten van de totale prothese. *Tschr.tandheelk.* 67:663-671 Oct. 1960

### **Partial denture design for patients with attrition of the anterior teeth**

In approximately 25 per cent of the patients requiring lower partial dentures, loss of all the upper teeth has occurred. In most instances, the remaining lower anterior teeth show a high degree of attrition which usually has been caused by the masticatory forces exerted on their occlusal surfaces by the previously inserted complete denture.

This specific type of extreme attrition seems to be the result of a complicated process, an interplay of several factors such as the patient's masticatory habits, the alignment of the artificial upper teeth in relation to the few remaining lower teeth, the resistability of the periodontium to the exerted stresses and the condition of the hard structures of the lower anterior teeth. In most patients showing such a condition, the construction of a customary lower partial denture is improper and functionally undesirable.

Occasionally, however, the severe attrition of the few remaining lower anterior teeth provides the hard tooth structures with an adaptable protection against overload and trauma. The shortening of the crowns, resulting from attrition, seems to offer a certain degree of protection to the periodontal membrane, the gingiva and the alveolar bone. Secondary dentin is formed which keeps the pulp vital.



Figure 1 (Left) Anatomic condition indicating the construction of a fixed lower partial denture with free-end saddles and splint. There is severe attrition of the lower anterior (but still vital) teeth. Figure 2 (Right) Metal cast structure of the denture. Hood-shaped metal splint and free-end saddles form a unit

Prosthetic repair in patients with severe attrition of the remaining lower anterior teeth cannot be designed to increase artificially the length of the involved teeth by indiscriminate use of cast gold or veneer crowns. The construction of a fixed lower partial denture with free-end saddles and a metal splint is recommended. The metal splint should cover the occlusal surfaces of the abraded teeth in a hood-shaped form, sufficiently thick to attain the normal level of occlusion. The splint is attached to the teeth by two mucosal (stabilizing) clasps terminating in a pellet.

Prior to impression taking, all existing carious lesions must be treated (by amalgam fillings) and

the sharp edges should be carefully polished.

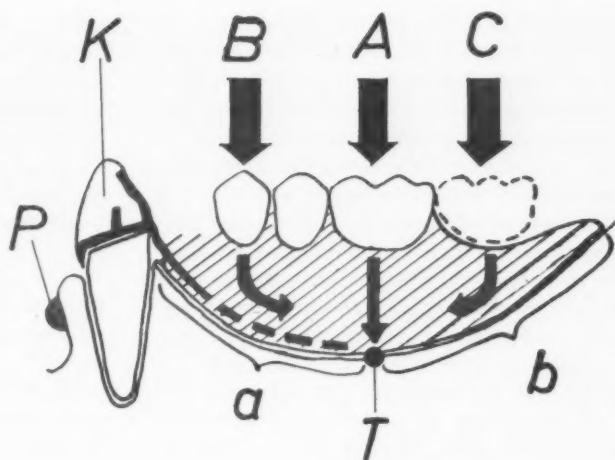
In patients showing severe attrition of the lower anterior teeth (Fig. 1), a fixed lower partial denture with free-end saddles and stabilizing splint will obtain the maximum esthetic and functional effects. The metal cast construction of the denture (Fig. 2) includes the hood-shaped splint which with the free-end saddles forms a continuous unit. The success of this type of prosthetic service depends on the proper execution of technical procedures. After the prosthetic needs of the patient have been determined, the restorative design should be sketched on a chart and on the study casts. The chart should include the clinical

Figure 3 (Left) The completed denture prior to insertion. The lower part (mirror image) shows the splint completely covering all abraded teeth. Figure 4 (Right) The completed denture after insertion





Figure 5 Diagram demonstrating the construction, function and effects of the denture



reasons for the selection of the specific type of partial denture, and the materials to be used in denture construction.

The material to be used in the construction of this type of denture must be nonirritating. The material must also be dense, strong and smooth, maintain its form and not react to oral fluids by producing an unpleasant odor or disagreeable taste. Although gold, porcelain and acrylic resins are the materials generally used, unless properly manipulated and finished, they, too, may become irritating to the soft oral tissues.

The completed fixed lower partial denture (Fig. 3) will permit an insignificant hinge movement. Although the movement's axis lies in the region of the remaining teeth, the stabilizing splint will prevent the involvement of the teeth and the periodontal tissue in this limited hinge movement.

The satisfactory esthetic effects of the inserted denture are shown in Figure 4. In normal mouth position the pellets attached to the mucosal clasps are not visible.

The diagram (Fig. 5) demonstrates the construction, function and effects of the denture. The hood-shaped splint (K) covers loosely, but completely, the abraded teeth. The alveolar process has its deepest point at the center (T) and ascends distally. The arrows (A, B and C) designate the direction of the masticatory pressure. If the maximum masticatory force meets the contact point (A) above the deepest point of the alveolar process, no displacement of the

denture can occur. However, if the maximum masticatory force meets the lateral contact points (B or C), a displacing tendency might be experienced. This can be prevented by raising the stabilizing splint (K) a little. The occlusal surface of the fixed denture may be terminated above the deepest point of the alveolar process (T); whereas, the lateral free-end saddles should be extended distally and the axial contours of the crowns should be accentuated more to increase their functional and stabilizing values.

If, after many years of satisfactory service, the patient requires renewal or readjustment of the denture, this can be achieved without unnecessary exposure of the gingival margins or damage to the remaining teeth.

Schwindling, R. Dental Clinic, University of Heidelberg, Hospitalstrasse 1, Heidelberg, Germany. Die starr verankerte Freiendprothese bei stark abradierem Frontrestgebiss im Unterkiefer. Zahnärztl. Welt & Reform 61:658-660 Oct. 25, 1960

### Significance of phonetics in complete denture service

Clinical observations have revealed that a significant number of complete denture patients show certain imperfections in phonetics, especially a reduction in their ability to manipulate the tongue-tip. Their inability to form properly the sounds t, d, n and l seems to be particularly pronounced.

Of the three functions which the complete denture should restore—mastication, deglutition and phonation—only phonation requires an impeccable denture retention. This requirement should condition the impression technic to be used. With the impression materials currently in use, the time during which impression taking and modeling may be performed properly is almost uncontrollable and—in many instances—far too short. Only the thermoplastic impression pastes seem to fulfill requirements if applied at mouth temperature.

The modeling of the prosthetic edges by massaging the lips and cheeks of the edentulous patients, or by movements imposed on the patients, is not only discomforting but inconstant. Success depends on the individual aptitudes of dentists and patients. Only that type of impression taking in which postinsertion phonation is considered will produce satisfactory results.

The author proposes the use of modeling materials held in contact with the dental arches during impression taking by springs attached to the trays.

The results obtained by the use of this impression technic indicate that the complete dentures will not impair articulation and intelligibility of speech.

The quality of retention in an inserted complete denture becomes obvious after about one week. Adjustments or modifications are seldom necessary. It is felt that the results of complete denture service, using the recommended technics in handling the finished impression and model casting, indicate the importance of specifying the criteria employed in evaluating and describing the speech of patients with complete dentures. A sizable number of such patients cannot be readily assisted through postinsertion speech therapy.

Prosthodontic specialists will be needed to determine whether tissue structure and function have not been interfered with. The use of temporary or permanent "phonetic" dentures is suggested as a means of speeding up postinsertion speech development and training. Patients will experience a sensation of comfort, and their active participation in impression taking and modeling processes will represent a psychologic factor which is extremely favorable for rapid acceptance of the complete dentures.

Devin, R. Ecole Odontologique de Paris, 71 Rue de Rennes, Paris 6, France. Empreintes phonétiques. *Rev.mens.suisse odont.* 71:725-739 June 1961

## Oncology

### Mechanical irritation of the oral mucosa, a causative factor in the etiology of carcinoma

Irritation of the tongue or the oral mucosa by jagged teeth or ill-fitting dental restorations must be considered an important factor in the causation of any type of malignant tumor of the oral cavity.

The author describes a squamous cell carcinoma which developed beneath a complete upper denture in a patient who did not exhibit any other precancer symptoms such as leukoplakia, chronic glossitis, oral fissures or ulcerations.

The degree of malignancy of a tumor seems to depend on the individual susceptibility, the tumor site and the cellular structure; however, in this patient there was no evidence of an individual (familial) susceptibility to cancer. In addition, there was no other factor observable than the continuous mechanical irritation of the mucous membrane which was caused by an ill-fitting complete upper denture.

Ever since research has demonstrated that certain chemical substances, roentgen rays and other factors may have cancerogenic effects on the soft and hard oral tissues, preventive procedures have helped to reduce the incidence of oral cancer.

The prevention of chronic mechanical irritation of the oral mucosa, caused by teeth, dental restorations or dentures, seems to be the dentist's most important contribution to the fight against cancer.

Oral carcinomas are malignant epithelial tumors in which the affected cells exhibit an atypical arrangement with varying degrees of differentiation.

In instances in which there is a local extension of the carcinoma involving the bones (as in the case reported), the extension takes the form of a destructive process spreading through the cancellous tissues. Typical features of an oral squamous cell tumor are the lack of sequestration and the absence of reparative reactions.

The site of the malignant tumor, possibly caused by chronic irritation of the oral mucosa,

usually corresponds with the margins of the denture which have exerted, for a comparatively long time, a localized traumatic pressure, thereby promoting the development of a precancerous decubital ulceration. The relation between such a chronic decubital ulcer and an oral carcinoma appears to be more than a probability.

Treatment consists of surgical enucleation of the tumor, and block dissection of the lymph nodes when there is the slightest suspicion of metastasis. In instances of oral carcinoma developing in regions that are potentially highly susceptible to malignancy (among them the oral cavity), many surgeons routinely dissect the lymph nodes, even if these were not palpable preoperatively. Nonpalpability of lymph nodes is not sufficient evidence for freedom from metastasis.

Bisig, Meinrad. Dental Institute, University of Zurich, Switzerland. *Mechanische Schleimhautschädigung und Karzinom*. *Schweiz. Mschr. Zahnheilk.* 71:243-247 April 1961

#### **Possible endocrine effects of mixed tumors of the salivary glands**

Three forms of mixed tumors of the salivary glands should be distinguished clinically and diagnostically: (1) adenoma simplex and tubular adenoma; (2) mixed tumors of the salivary gland type, and (3) cylindroma.

Adenoma usually is a benign tumor of glandular origin which, during its development, resembles an acinus or a tubule of the involved gland. Adenoma simplex designates an uncomplicated glandular hyperplasia, whereas a tubular adenoma is an adenoma in which the spaces appear elongated in the form of tubules; its structure resembles that of a tubular gland.

Mixed tumors of the salivary gland type are characterized by structural transformations into chondromalike or myxomalike tissues and partial histolysis.

Cylindroma is characterized by a slimy swelling of the interstitial structures without histolysis of the epithelium but with the structural transformation into elongated, twisted (cylindrical) cords containing hyaline or hyaline connective tissue.

In mixed tumors of the salivary glands, the mucopolysaccharides of hexostamine and uronic acid (especially in the chondromalike or myxomalike forms) are of mesenchymal origin. The

phanerosis and growth of these tumors are activated by a substance of epithelial origin.

In all types of mixed tumors of the salivary glands, the neoplasms function in the same fashion as endocrine tumors, resulting in secretion of serotonin.

Not all clinical features must be present simultaneously to make the diagnosis, but the cylindroma of the parotid gland has definite, clinically demonstrable endocrine effects.

The treatment of choice is the surgical removal of all or as much of the tumor tissue as possible, to reduce the amount of endocrine substances. Roentgenotherapy is of doubtful value.

Feyrter, F. University of Vienna, Wiedener Hauptstrasse 40, Vienna 4, Austria. *Zur Frage der Endokrine des sogenannten Speicheldrüsenmischtumors*. *Deut. med. Wschr.* 86:335-339 Feb. 24, 1961

#### **Sarcoma complicating fibrous dysplasia**

Four instances of sarcoma arising in lesions of fibrous dysplasia were encountered at the Mayo Clinic between 1930 and 1956. In all four instances, the malignant tumors developed in facial bones, and the benign lesions had been subjected to ionizing radiation.

The discovery of these four instances in which sarcoma developed in association with fibrous dysplasia of facial bones suggests that this association may be more common than was formerly believed. Two of the malignant lesions were in the maxilla and two in the mandible. The fibrous dysplasia involved multiple facial bones in three patients. Three of the patients were men and one was a woman. None had manifestations suggestive of fibrous dysplasia in other than facial bones.

In three patients, tumefaction of the jaw in childhood had been caused by tumors that had ceased growing at puberty. Deformity, misdiagnosis and poor understanding of the disease resulted in overtreatment of the original lesions in these three patients. With the onset of sarcoma, the clinical picture changed from that of an indolent process to that of a rapidly growing tumor in each instance.

The intervals of time between irradiation and diagnosis of sarcoma were 3, 7, 11 and 25 years.

Delay in diagnosis dimmed the prognosis in these four patients. None of the patients has sur-

vived for five years; three died from cancer in less than two years. On biopsy, three of the lesions were reported by pathologists to be those of fibrous dysplasia, even after the lesions had exhibited clinical evidence of malignancy. This was because of inadequate biopsy specimens. The use of fresh frozen sections to determine the adequacy of the specimens could obviate this problem.

The clinical, roentgenographic and histologic evidence makes a strong case for malignant transformation of fibrous dysplasia.

A review of all the cases of fibrous dysplasia and all the cases of sarcoma recorded in the files of the Mayo Clinic revealed no instance of concomitant sarcoma and fibrous dysplasia in which ionizing radiation had not been used. The evidence suggests that irradiation may be an inciting factor in the development of sarcoma in instances of fibrous dysplasia.

Tanner, Howard C., Jr., and Childs, Donald S. Mayo Clinic, Rochester, Minn. Sarcoma complicating fibrous dysplasia: probable role of radiation therapy. *Oral Surg., Oral Med. & Oral Path.* 14:837-846 July 1961

### Oral lymphomas

A review of six case reports of patients with oral lymphoma, seen between 1952 and 1959, suggests that the common initial sign of these lesions is swelling, with or without accompanying pain. The swelling usually is hard or firm and fixed to the mucous membrane or the underlying bone. The site, however, may not be directly contiguous with the teeth, suggesting the possibility of unrelated causes. It is in those instances in which the alveolus is involved directly that errors in diagnosis most readily occur.

Another sign often present is anesthesia or hyperesthesia of the skin distributed regionally. This is of the utmost diagnostic importance and must never be ignored because it indicates infiltration of the nerve trunk by some form of neoplasm. Any lesion of unusual appearance with these features should be suspect immediately, especially if roentgenographic bone changes of diffuse destruction are present. Biopsy is required for precise diagnosis.

Enlarged regional nodes often are present and always should be investigated. The oral lesions

are solitary, and therefore the patient is first seen at a stage when control of the disease has the best chance of success. If other sites in the body are not involved, the response to high-voltage roentgenotherapy will be remarkably good. A histologically anaplastic lesion does not necessarily imply a poor prognosis.

Oral lymphomas are frequently, indeed almost invariably, misdiagnosed. Pain in the jaws may be unconnected with the teeth, and what is thought to be a simple toothache will not be cured by tooth extraction. Superficial lesions of lymphomas which have ulcerated may resemble the lesions of necrotizing ulcerative gingivitis and may be treated unsuccessfully as such until their true nature is revealed.

Cook, H. P. Middlesex Hospital, London W.1, England. Oral lymphomas. *Oral Surg., Oral Med. & Oral Path.* 14:690-704 June 1961

## Therapeutics

### Trigeminal neuralgia

Audible clicking of the cartilage, or tenderness of the joint to palpation, indicates abnormality of the temporomandibular joint. Also, there is a syndrome which may arise from relatively trivial damage to a temporomandibular joint which itself can remain painless.

Usually in the patient with so-called atypical trigeminal neuralgia, palpation of the deep aspect of the joint elicits pain and also results in his having an uncomfortable day or two subsequently. The pain elicited appears to originate in the anterior head of the lateral pterygoid muscle.

The author in cooperation with an orthopedist began treating such patients first by injecting a cortisone suspension into the muscle, and later by injection into the temporomandibular joint space. Results have been mixed. The intra-articular injection is difficult to perform and not always successfully achieved. When the injection has been easy, the results have been satisfactory.

In some undiagnosed instances of trigeminal neuralgia, the site of the elusive pain may be the

lateral pterygoid muscle, which is almost inaccessible above, behind or lateral to the maxillary tuberosity. These patients relate a history of pain which is localized most often in the region superficial to the maxillary antrum, but sometimes may be referred to the ear, the malar region, the angle of the mandible, or even the neck; but whatever the site complained of, the pain can be elicited by palpating the lateral pterygoid muscle. The frequency and severity of the paroxysms decrease progressively when cortisone injections are made weekly into the temporomandibular joint space.

Frost, Michael. Essex County Hospital, Colchester, England. Trigeminal neuralgia. *Lancet* No. 7153:765-766 Oct. 1, 1960

### Treatment of herpetic and aphthous stomatitis

Forty-six children with acute generalized herpetic gingivostomatitis were treated with a viable mixture of *Lactobacillus acidophilus* and *L. bulgaricus*. The mixture is available in two forms: tablets and granules. One packet of granules (1.0 Gm.) is equivalent to four tablets. The mixture is administered by mouth after which a glass of milk is taken. The milk acts as a culture medium for the acidophilus and bulgaricus bacilli.

Each child was given a three day supply of the viable mixture in the tablet or granule form, and was instructed to chew four tablets or to take one packet of granules four times a day and to drink a glass of milk after taking the mixture.

The results of treatment were as follows: in 16 per cent of the children the lesions healed in two days; in 43 per cent, three days; in 22 per cent, four days; in 11 per cent, five days, and in 8 per cent the lesions healed in six days.

Because of these excellent results, the mixture of *L. acidophilus* and *L. bulgaricus* was given to a group of ten adults with past histories of recurrent herpes simplex lip lesions. The mixture was given during the burning or itching stages, before vesicular eruption, in an effort to abort the lesions. In 100 per cent of the patients, the vesicles never erupted.

Twenty-two patients with recurrent aphthous stomatitis also were treated with four tablets and a glass of milk four times a day. In 9 per cent of the 22 patients, the lesions healed in one day; in 23 per cent, in two days; in 36 per cent, in three

days; in 23 per cent, in four days, and in 9 per cent the lesions healed in five days.

The results of these clinical observations indicate that a viable mixture of *L. acidophilus* and *L. bulgaricus* is effective in the treatment of herpetic and aphthous stomatitis. The mode of action of this bacterial mixture on these diseases has not been determined.

Abbott, Paul I. 413 Saddle Rock Road, Norfolk, Va. Viable mixture of *Lactobacillus acidophilus* and *bulgaricus* in treatment of herpetic and aphthous stomatitis. *J.Oral Surg., Anesth. & Hosp.D.Serv.* 19:310-312 July 1961

### Premedication for mentally retarded and handicapped patients

Experiences at the dental division of Porterville State Hospital, a hospital for mentally retarded patients, have resulted in use of the following drugs or combinations of drugs as premedication for dental treatment:

Group I—Nervous patients who are high-strung, noisy, obviously or easily upset but not too resistive. Sedation usually is achieved with oral secobarbital.

Group II—Disturbed and resistive patients with a higher level of intelligence. The sedative used is either chlorpromazine or promethazine, administered intramuscularly.

Group III—Disturbed and resistive patients with a lower level of intelligence. The sedative used is one of the following combinations: (1) chlorpromazine plus meperidine hydrochloride, both administered intramuscularly; (2) promethazine plus meperidine, intramuscularly, or (3) promethazine plus meperidine plus scopolamine, all intramuscularly.

Group IV—Very stubborn and resistive patients who are older and larger, hence difficult to treat. Some of these patients will respond to the medications already mentioned; others may require one of these two combinations: (1) pentobarbital or amobarbital plus meperidine plus scopolamine, all administered intramuscularly, or (2) pentobarbital or amobarbital, usually administered intravenously. A few of these patients can be treated safely only under general anesthesia.

Group V—Physically handicapped children, such as those with cerebral palsy. These patients require little or no premedication. Occasionally,



a sedative such as oral secobarbital sodium is used.

Group VI—This group includes patients with special problems, and each instance must be considered individually.

Kennedy, John B., Jr. Porterville State Hospital, Porterville, Calif. Use of premedication in dental treatment for mentally retarded and handicapped patients. *J.Oral Surg., Anesth. & Hosp. D.Serv.* 19:376-379 Sept. 1961

### Local antibiotics in dental practice: tyrothricin-xanthocillin combination

Bacitracin, neomycin, tyrothricin and xanthocillin are the local antibiotics most frequently used in German dental and oral surgical practice.

Bacitracin, discovered in 1945, is an antibacterial substance produced by the growth of a gram-positive, spore-forming microorganism (*Bacillus subtilis*). It is effective against a wide variety of gram-positive bacteria including hemolytic and nonhemolytic streptococci, staphylococci and pneumococci, anaerobic cocci and clostridia, corynebacteria, spirochetes of syphilis and most oral pathogenic microorganisms. It is almost ineffective against most aerobic gram-negative bacteria. The speed of its antibacterial action is in direct proportion to its concentration. This local anesthetic is important because it is especially effective against bacteria which are resistant to penicillin and other antibiotics and because of its low sensitizing property (patients seldom, if ever, develop sensitivity to bacitracin even after repeated courses of administration). The antibiotic is available in the form of ointments, powders, solutions and tablets.

Neomycin, discovered in 1949, is the sulfate of an antibacterial substance produced by the growth of *Streptomyces fradiae* (isolated by Waksman and Lechvalier), and contains an amount of neomycin sulfate equivalent to 60 per cent of neomycin base. It is effective against both gram-positive and gram-negative microorganisms, especially staphylococci. It is usually well-tolerated by the patient and is relatively nonirritating when topically applied. The antibiotic is available in the form of ointments, powders (injection and topical), solutions and tablets.

Tyrothricin, discovered in 1939, is an antibacterial substance produced by the growth of *Bacil-*

*lus brevis* (isolated by Dubois and Hotchkiss), and consists mainly of gramicidin and tyrocidine hydrochloride. It is effective against gram-positive microorganisms such as pneumococci, streptococci and staphylococci, inhibits enzymatic action, retards bacterial growth and causes lysis of susceptible bacteria. The antibiotic is ineffective when administered orally and dangerous when given intravenously. It is available in solution (for topical use only), salves and gel suspension, and may be combined with other local antibiotics such as bacitracin, penicillin, streptomycin and xanthocillin.

Xanthocillin, discovered in 1948, is an antibacterial substance produced by the growth of *Penicillium notatum* (isolated by Rothe). It is extremely effective against all bacteria resistant to penicillin and other antibiotics such as *Proteus*, *Pyocyaneus*, coliform bacteria, *Clostridium tetani*, the clostridia causing gaseous gangrene or progressive bacterial synergistic gangrene.

Recently, a tyrothricin-xanthocillin combination became available in the form of tablets (containing 500 gamma tyrothricin and 5,000 gamma xanthocillin), salves (containing 1,000 gamma tyrothricin and 900 gamma xanthocillin), powders (containing 500 gamma tyrothricin and 4,500 gamma xanthocillin), gel suspensions (containing 500 gamma tyrothricin and 4,500 gamma xanthocillin), and endodontic pastes (containing 1 per cent tyrothricin and 1 per cent xanthocillin in an indifferent silicone vehicle).

Dental procedures in which the use of the tyrothricin-xanthocillin combination (TX-Grüenthal) is indicated include marginal and suppurative gingivitis, ulcerative (necrotizing) stomatitis, and inflammations of the oral mucosa associated with menstruation or pregnancy.

Oral surgical procedures in which the use of this antibiotic combination is indicated include postoperative treatment of surgical wounds, dry alveoli, impacted third molars, and all oral infections caused by penicillin-resistant organisms or in patients who are sensitive to other antibiotic agents.

The antibiotic combination was found most useful in endodontic treatment. It is highly active against all gram-positive bacteria and causes no cross resistance. Its toxicity is minimal, its stability great, and it is neither irritating nor causes

pain at the site of the administration. The drug is especially suitable when used prior to the extirpation of vital pulps or when unusually long duration of local anesthesia is required. Activating effects associated with this antibiotic combination consist in epithelization and granulation-promoting results which support the healing effects of phosphatases in the region of the periapical spongiosa.

Weichold, F. Kellermannstrasse 47, Mülheim, Ruhr, Germany. Lokalanästhetika in der zahnärztlichen Praxis unter besonderer Berücksichtigung der Kombination Tyrothricin-Xanthocillin (TX). Zahnärztl. Welt & Reform 62:350-354 June 10, 1961

## Periodontics

### Periodontics as cosmetic dentistry: improving the patient's appearance

Although cosmetic dentistry usually is considered relegated to the fields of restorative dentistry and orthodontics, periodontics also can contribute immeasurably to an improvement in the appearance of patients. The problems involved here may require surgical as well as prosthetic applications.

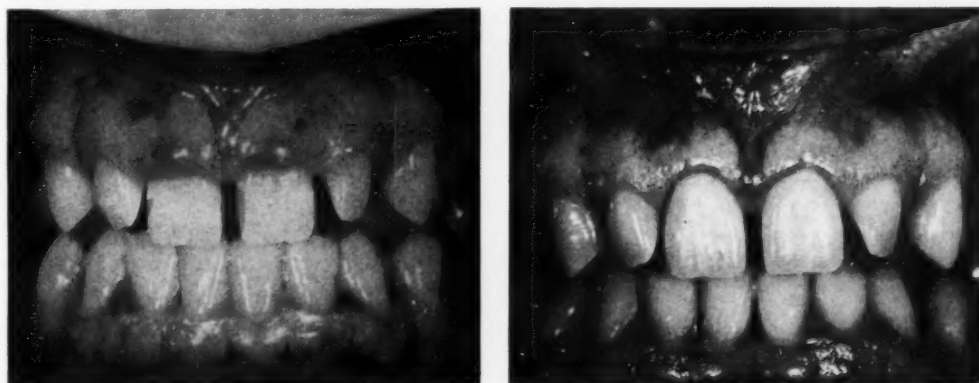
Severe gingivitis may be the cause of inflamed and bulbous-appearing gingiva. Prophylactic treatment may achieve not only a healthy mouth

but also a more acceptable esthetic appearance, and a rejuvenated pride and interest on the part of the patient in his oral appearance. Dark cervical rings of calculus and stain frequently are mistaken by the patient as caries and an indication of a deteriorated dentition no longer worthy of care. The removal of these deposits from the teeth may be the key to a successful approach to home care.

In many instances, an improved cosmetic appearance is achieved solely by recontouring of tissue. The front cover illustrations are Kodachrome photographs depicting the periodontal conditions of a 19 year old girl with generalized suppurative periodontitis. Gingival suppuration and alveolar resorption existed around all the teeth, and were treated by gingival surgery. The photograph at the upper left depicts the lower gingival margin immediately after the surgical dressing was removed; upper right—the upper gingival margin immediately after the surgical dressing was removed (note healing of gingiva in lower arch); lower left—one month later; lower right—three months after gingivectomy (note improved appearance of mouth).

Clefting of gingival tissue on the labial aspect of the mandibular incisors can be corrected by lowering the anterior frenum attachment and a localized gingivoplasty. Frequently, a gingivoplasty will achieve a desirable cosmetic effect and will stimulate the patient to apply good oral

Figure 1 Left: Before gingivoplasty. Right: After gingivoplasty



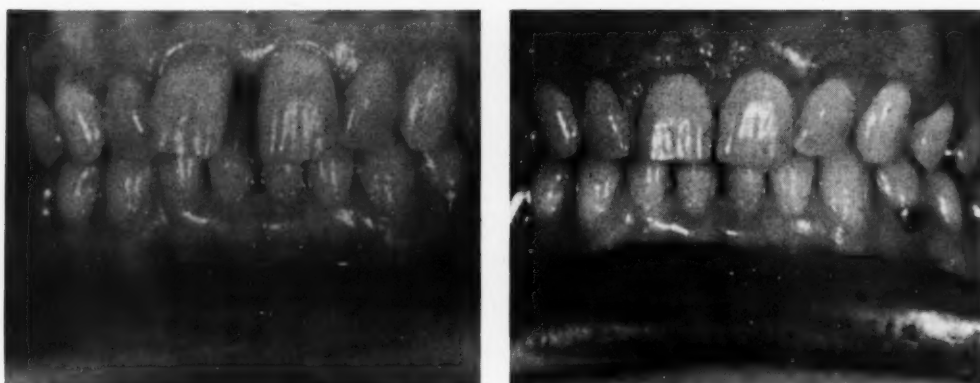


Figure 2 Left: After gingivectomy, without labial appliance. Right: Same patient with labial appliance in place

hygiene practices for the continued maintenance of the health of his gingiva and teeth. (Fig. 1).

Gingivectomy procedures commonly employed in periodontal treatment serve several purposes. By reduction of the pocket areas, oral hygiene is improved and tooth life is prolonged. Many gingivectomies also achieve a renewed cosmetic harmony through the re-establishment of good soft tissue and underlying bony contour.

Since drifting of anterior teeth occurs frequently in mouths with periodontal disease, the teeth of many of these patients, after the periodontal pockets have been reduced by surgery, are realigned through the use of some form of Hawley appliance or banding. On completion of these tooth movements, the teeth tend to return to their former malalignment even after equilibration. Therefore, some type of retainer must be constructed. A simple, cosmetic gingival appliance may be useful for this purpose. Figure 2 illustrates a typical case after gingivectomy, with and without such an appliance. This appliance is retained in position solely by the flexibility of the acrylic resin, and is readily removed for cleaning. Such appliances have caused neither discomfort nor gingival irritation, even after several years of use.

The construction of such a labial splint is simple. If soft wax is placed on the lingual surfaces of the teeth to be covered by the splint, the possibility of tearing the impression in the interproximal regions will be reduced. The wax is forced

labially until an accurate impression can be taken which will provide cervical adaptation and sufficient retention. A stone model is poured. The model is waxed up to the desired contour. The wax is stippled with a toothbrush to give the finished appliance a more natural appearing surface. The waxed-up model is placed in a denture flask with the labial surface up, and processed in any one of the characterized acrylic resins.

Occasionally, a simple reduction in length of the incisal edges of the anterior teeth to make them more uniform will do much to improve the appearance of the patient. Teeth with periodontal involvement often will drift incisally, producing an unpleasing relation which may be of great concern to the patient. The reduction of these teeth by selective grinding will improve the patient's appearance and reduce undesirable forces on the teeth.

The cosmetic results of periodontal treatment merit serious consideration. Satisfactory results may be achieved through scaling, or surgery or prostheses may be required.

Oral hygiene can be influenced greatly by the mental attitude of the patient. The patient's sense of pride in his smile is a requisite in any restorative program. The cosmetic results of periodontal therapy may be the deciding factor for successful treatment, by making the patient more receptive to accepting a thorough home care program.

Swenson, Henry M., and Hansen, Niles M. School of Dentistry, Indiana University, Indianapolis, Ind. The periodontist and cosmetic dentistry. *J. Periodont.* 32:82-84 Jan. 1961



### Electrically powered toothbrush in home periodontal treatment

Twenty patients diagnosed as having periodontitis were treated by root planing and divided into two groups of ten. One group was instructed in the use of the electrically powered Broxodent toothbrush and the second group used conventional hand toothbrushes and served as controls. The experiment lasted six weeks. All patients returned weekly for further treatment and evaluation of home care. The presence of materia alba, the color of the gingiva, and stippling were scored.

Measurable improvement was noted in all 20 patients, thus reaffirming the correlation between decrease in deposits of materia alba and increase in gingival stippling.

The results obtained in the two groups were parallel, except that after the fourth week the improvement in gingival stippling was more pronounced in the group that used the electrical instrument. This result appeared to be related to the greater effectiveness of the Broxodent toothbrush in gingival massage. The rapid vertical oscillation of the Broxodent brush head strokes the gingiva at a higher frequency than occurs with hand brushing.

Toto, Patrick D., and Farchione, Alfred. Loyola University School of Dentistry, Chicago, Ill. Clinical evaluation of an electrically powered toothbrush in home periodontal therapy. *J. Periodont.* 32:249-254 July 1961

## Oral surgery

### Conservative treatment of dental fistulas

Dental (alveolar) fistulas may develop in two ways; either by discharge of pus from the apex to the surface or by formation of a liquid inflammation product composed of leukocytes in an alveolus after extraction of an infected tooth.

Because of the lack of localized symptoms, the presence of a dental fistula is often discovered in a routine roentgenographic examination which also may provide clues for the differential diagnosis. If the roentgenogram shows a chronic in-

flammation in the apex region, it can be assumed that the fistula has its origin at the apex, whereas destruction of the alveolar bone associated with other symptoms such as enlargement of the periodontal membrane, alterations of the spongiosa and replacement of osseous tissue by granulation tissue indicates that the fistula has its origin in the alveolar region.

The final differentiation between the two pathologic possibilities of fistula formation is difficult. If the roentgenographic examination reveals that the fistula originated from an inflammation involving mainly the root, immediate and thorough endodontic treatment is indicated. In instances of periodontitis, chronic inflammation of the apex or extreme pain after root canal filling, an artificial opening may be created to permit insertion of ionic medications or antibiotic agents in the root canal. However, there are root canals which are inaccessible for the syringe, such as in extremely curved roots, those in roots involved in hypercementosis (especially in senescent patients). In patients with rheumatism, infectious arthritis, myocarditis, endocarditis, gastrointestinal ulcers, nephritis and eye infections conservative treatment of fistulas should be abandoned and the involved tooth extracted.

In all other instances, iontophoresis will be the treatment of choice. Drainage through the outlet of the fistula is followed by an application of phenolsulfonic acid (80 per cent) or a solution (50 per cent) of trichloroacetic acid. In extremely sensitive patients, these procedures may be carried out under surface anesthesia (injection of 1 cc. procaine hydrochloride). A short injection needle enveloped by a cotton thread soaked in zinc iodide, hyaluronidase or tricesolamine is inserted. To protect the soft tissues of the cheeks and gingiva, rubber strips should be used.

The treatment should be repeated during several visits. In selection of the type of treatment, the patient's general health and resistance should be considered. After the treatment is completed, there will be roentgenographic evidence of elimination of the infection in the tooth and the periapical structures and of replacement of the granulation tissue by newly formed normal bone.

Conservative treatment of dental fistulas is principally recommended for anterior teeth. The favorable results obtained seem to warrant a

much more extensive use of this technic. Similar results were obtained with this method in the conservative treatment of dental granulomas which could not be treated successfully by surgical incision and drainage.

Seidner, Siegfried. 10 Benami Street, Tel Aviv, Israel. Konservative Behandlung in Fällen von Fisteln. Schweiz.Mschr. Zahnk. 70:998-1001 Nov. 1960

### Factors involved in tooth transplantation

The results of serial experiments, carried out at the College of Dentistry, Howard University, Washington, D.C., indicate that there are many factors involved in the transplantation of the anlage of teeth; factors that govern success or failure, the occurrence of pathologic changes and the future development and calcification of the growing teeth.

The following findings seem to be of particular clinical significance:

1. Both homogenous and heterogenous transplants of tooth germs will survive transfer to selected sites in experimental animals, and will grow and develop to mature teeth.
2. Carcinogenic chemicals may change profoundly the expected growth and development of transplanted tooth germs. Persisting cells of the outer enamel epithelium may acquire criteria for malignancy.
4. Several similarities were observed between the results produced by carcinogenic substances and those produced by the Shope papilloma virus, the most striking similarity being an abundant keratin formation.
5. Different results were obtained when castrated animals were used as hosts to transplanted tooth germs treated with carcinogenic substances. There was a greatly reduced keratin formation, associated with a greatly increased vascularity and a greatly increased rate of anaplasia or metaplasia of the surviving cells.
6. Significant increases in the size of tooth germ transplants were observed in guinea pigs. Homogenous transfers to female castrated animals resulted in a biologic activity of component cell layers which could be maintained for extremely long periods.
7. Tooth term transplantations performed with human specimens showing a great variety of cel-

lular types (glioblastoma multiforme) prevented excessive growth of tumors in the involved region. There was continued growth and development of implanted tooth germs, however, with an activity of the pulp comparable to that observed in the pulps of castrated animals.

Tooth germs for experimental transplantation should be obtained at stages before the hard tooth substances begin to calcify. At these developmental stages, the tooth germ must be removed from its follicles without damage to the pulpal region. In most instances, transplants handled with care and accompanied by adequate periodontal tissue will retain vitality after transplantation.

Fleming, Harold S. Howard University Dental School, Washington, D.C. Factors involved in the transplantation of teeth. [in English]. Parodontol., Zürich 15:11-32 Feb. 1961

### Polyamide fish line sutures

Fishing line made from polyamide resin was tested experimentally and clinically as suturing material in maxillofacial surgical operations. The thread was used in 45 operations on 25 dogs.

The results were satisfactory. The margins of the external stitches did not cut through, there were no sores or maceration, and the scars were soft and elastic. Histologic examination of excised portions of tissue with the thread showed that on the fifth postoperative day slight hemorrhage occurred around the suture and aseptic necrosis and granulation tissue appeared. On the fifteenth day the inflammatory reaction subsided or disappeared and the granulation tissue was replaced by areolar connective tissue. Between the twenty-fifth and thirtieth day a delicate connective tissue was formed.

Polyamide thread 0.1 to 0.2 mm. in diameter was used on 67 patients in 77 operations on the face, neck and body, and in the formation of a Filatov flap.

The sutures did not cut through the soft tissues and there were no sores or maceration. Reactive hyperemia often was absent. After removal of the stitches, the skin punctures rapidly disappeared without trace. The degree of inflammatory reaction was less and the inflammation period shorter than with silk suture. The scars were softer, thinner and more elastic than when silk was used.

Polyamide resin thread complies with all the requirements demanded of suture material to be used in maxillofacial operations.

Savchenko, V. E. Department of maxillofacial surgery and stomatology, Military-Medical Academy, Leningrad, Union of Socialist Soviet Republics. The application of polyamide thread as suture material in facial surgery. *Abs.Soviet Med.* 5:858 June 1961

### Behavior and fate of bone-cartilage grafts

The problem of repairing the articular surfaces with tissue obtained from regions adjacent to the temporomandibular joint, that is, with bone-cartilage grafts, has recently come into the foreground in dental research on transplantation.

For practical reasons, conserved homogenous articular tissue is best suited for grafting and transfer. In order to use this material, it became necessary to search for a satisfactory medium for tissue conservation, and to select the most favorable operative method.

Serial investigations were carried out at the Institute of Pathology of the University of Hradec Králové, Czechoslovakia. Dogs were used as experimental animals. Grafts of cartilaginous tissue with subcartilaginous osseous tissue, taken from the surface of the temporomandibular joint, were conserved at a temperature of 4°C. in gauze saturated with a physiologic saline solution containing 5 per cent glucose, and in a solution containing 10 per cent homogenous serum and paraffin oil.

After 14, 28 and 84 days, the grafts were examined histologically, and implanted into a circular incision made in the surface of the joint. Three months after transplantation, the behavior and fate of the bone-cartilage grafts were evaluated macroscopically and microscopically. The grafts conserved in the saline-glucose solution could be transplanted successfully up to 14 days after excision, whereas the grafts conserved in the serum-paraffin solution could be transplanted even after four weeks.

In more than a third of the 25 dogs, the grafts fitted perfectly and were firmly fixed, took well and remained viable. Because the congruence of the surfaces of the temporomandibular joint is one of the basic preconditions for successful transplantation, in a second series the entire joints were transplanted.

This report is concerned with the study of the fate of osteocartilaginous grafts between 2 and 24 months after transplantation. The purpose of the study was to find answers to the following questions: (1) how and when does such a graft take; (2) what changes occur in the cartilaginous part of the graft; (3) what influences are exerted by the synovial fluid, and (4) what are the conditions required for survival of conserved homogenous articular cartilage grafts.

The results were as follows:

1. Transplanted bone lamella of the graft was firmly united with its bed within six weeks after transplantation.

2. In the majority of instances, the implanted grafts were transformed within three months.

3. A specific line of demarcation between the graft tissues and those of the recipient region could be distinguished only in isolated instances.

4. The cartilaginous components of the grafts exhibited only slight signs of necrosis, mainly between the second and fourth months after transplantation.

5. Necrosis of the cartilage cells evidently became more intensive after the fifth month.

6. The superficial layers were mainly involved, less affected were the middle parts of the grafts, and least the basal layers.

7. In the basal layers of the grafts many cells survived and infiltrated gradually the superficial layers.

8. Surviving cells coming into contact with necrotic cartilage formed clusters of chondrocytes.

9. Twenty-four months after transplantation, the cartilage grafts appeared cellular throughout their entire structure. The cells contained an adequate amount of acid mucopolysaccharides, glycogen and fats.

10. The number of surviving cells, however, was smaller than that of normal cartilage.

The behavior and fate of conserved homogenous articular cartilage after transplantation depends on many factors: (1) the method and duration of conservation; most favorable results were obtained with the paraffin-serum solution at 4°C. and a conservation time of 14 days; (2) the thickness of the simultaneously transplanted bone lamella; the most favorable results were obtained with a thickness of 2 mm.; (3) the proper fitting and fixation of grafts to their beds; (4) adequate

nutrition of the superficial cartilaginous layers of the grafts by the synovial fluid, and (5) the continuous growth of the surviving cartilage cells during the time from the fourth to the fifth months after transplantation.

The number of the surviving chondrocytes was greatest when the conserving medium selected was most suitable (10 per cent homogenous serum and paraffin oil), and when the time of graft conservation was comparatively short (14 days).

Fiala, O., Herout, V., and Klen, R. Institute of Pathology, University of Hradec Králové, Nerudova 3, Hradec Kralove, Czechoslovakia. Behaviour and fate of conserved homogenous articular cartilage under experimental conditions [in English]. *Acta Chirurg. Plasticae* 3:154-158 April-June 1961

### Fractures of the condyloid process of the mandible

In this study 291 patients with fractures of the condyloid process of the mandible, treated by conservative methods, were observed.

The first object was to solve some difficult diagnostic problems relating to the verification of such fractures, and to assess the applicability of pantomography in verifying fractures. Changes caused by fractures verifiable by pantomographic examination were investigated with the aid of stereopantomography, needle electrodes used in electromyography, and by stereoscopic tracings. Stereopantomography, in particular, is a rapid and reliable method for diagnosing these fractures.

The second object was to investigate factors influencing the duration of immobilization applied in the treatment of fractures of the condyloid process, and to determine to what extent variation in duration of immobilization influences the primary and secondary results of treatment of fractures. The duration of immobilization is of no essential importance for the primary result of healing, but in instances of prolonged immobilization, the secondary results of healing seem to become impaired. In addition, there is a substantial increase in degenerative changes caused by trauma, clicking of the joint and crepitation in all types of fractures of the condyloid process after termination of the primary treatment.

A third object was to classify, with the aid of

electromyography, the appearance of coordinative disturbances of the muscles of mastication caused by fractures of the condyloid process of the mandible. In nearly all patients such disturbances develop, but generally they seem to be temporary.

Eighty references are cited.

Ekholm, Antti. Institute of Dentistry, University of Helsinki, Helsinki, Finland. Fractures of condyloid process of mandible. *Suomen hammaslääk.toim.* 57:1-80 1961

### Impaired blood circulation: a possible cause of trigeminal neuralgia

The relation between trigeminal neuralgia and impeded blood flow through the extracranial and intracranial parts of the vertebral artery was demonstrated by clinical observation of simultaneously occurring relief from facial pain after dissection of the posterior cerebellar artery without other surgical interference with the fibers of the trigeminal nerve.

Trigeminal neuralgia, however, occurred frequently after occlusion of the vertebral or posterior cerebellar arteries.

Traction on the cervical spine improved the impeded blood flow through the extracranial part of the vertebral artery, alleviating the paroxysmal pain which extended along the course of the trigeminal nerve. This surgical intervention—in combination with other physiotherapeutic procedures—was employed at the Surgical Clinic of the University of Munich for all patients with trigeminal neuralgia, and was found especially successful in those instances associated with osteochondral lesions or postural defects in the cervical spine.

Patients with Meniere's syndrome also responded favorably to this treatment because the intervention improved blood circulation through the internal auditory artery. In all instances, the increased blood flow benefited directly or indirectly the nuclei of the cranial nerves, especially those of the trigeminal nerve.

A more effective surgical treatment of trigeminal neuralgia has not been reported in the literature.

Weber, E. Surgical Clinic of the University of Munich, Goethestrasse 70, Munich 15, Germany. Zentral bedingte Gesichtsschmerzen und Vertebralisdurchblutung. *Acta neurochir.* 8:318-322 June 1961

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## Roentgenology

### Bone-soft tissue relation in lateral jaw roentgenograms

Operations for the correction of malocclusion result in alterations of the soft tissues. If a radio-paque paste is applied to the soft tissues (Fig. 1), both soft tissue contour and bone relation can be shown on the same roentgenogram. Such roentgenograms (Fig. 2, 3) provide an excellent basis for preoperative planning, maintenance of records, and postoperative assessment of surgical results.

Barium sulfate powder is mixed with ordinary tap water to create thin paste. A camel's-hair brush is used to apply the paste to the soft tissues which define the patient's profile. The desired lateral roentgenograms then are taken. The paste

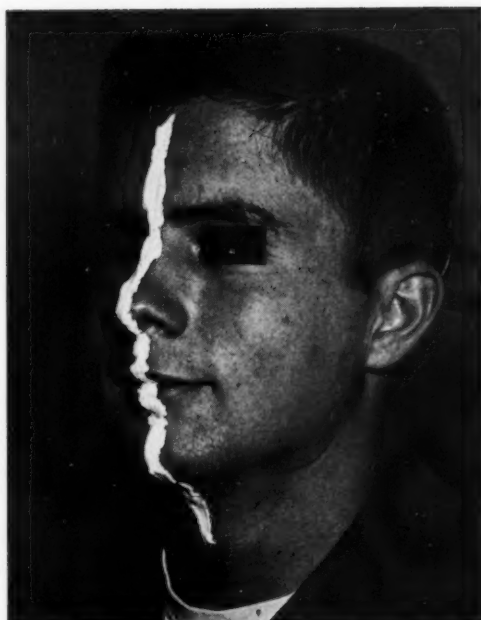
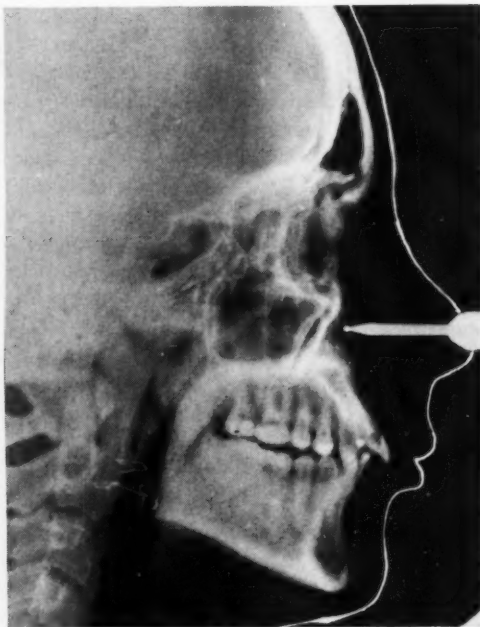


Figure 1 Paste applied on the patient

Figure 2 (Left) Preoperative view of patient with retrognathic occlusion. Figure 3 (Right) Postoperative view



also is useful for supplying a radiopaque landmark on the skin for relative orientation of other objects, such as foreign bodies. The paste is non-toxic and can be removed easily.

Cooksey, Donald E., and Ogden, Ingram W. United States Naval Dental School, Bethesda, Md. Bone-soft tissue relation in lateral jaw roentgenograms. *Oral Surg., Oral Med. & Oral Path.* 14:493-497 April 1961

## *Hospital dental service*

### **Survey of hospital dental departments**

In the ten year period 1948 to 1958, dental departments in hospitals in the United States increased, on the average, by more than 50 per cent, and the proportion of hospitals with dental departments increased from 29 to 35 per cent.

A survey in 1958 by the American Dental Association's Bureau of Economic Research and Statistics showed that among the 6,504 hospitals in the continental United States for which data were available, dental departments were established more frequently in federal hospitals than in hospitals under other auspices. Questionnaires were mailed to the chiefs of hospital dental departments in 2,352 hospitals listed by the American Hospital Association as having dental departments. The 1,004 responding hospitals reported that 9,798 dentists were on the staff; 94 per cent held hospital appointments, that is, were attending staff, and the balance were interns and residents (house staff).

Of the 561 interns and residents, 481 were in general hospitals.

Dental departments in nine out of ten hospitals were under the direction of a dentist. Dental departments in voluntary hospitals were less likely to be directed by a dentist than departments in hospitals under other auspices.

Dental hygiene services were not available in a majority of the responding hospitals. Training programs for attending dentists and for interns and residents were most frequently available in general hospitals. Federal hospitals had the largest number of training programs for attending

dentists whereas nonfederal governmental hospitals offered the largest number for interns and residents. Dental services were included in health service programs for the indigent in almost nine out of ten hospitals which had such a program. Formal liaison with the local dental society was developed in about one half of the responding hospitals.

Of the seven different types of dental service about which inquiry was made, psychiatric hospitals had the largest mean number, 5.9, and hospital departments of an institution were second with a mean of 5.3. Oral surgery was performed in the largest proportion of the hospitals participating in the survey (95 per cent); pedodontics was least frequently available, in but 35 per cent of the hospitals.

In 562 general hospitals the mean number of in-patient admissions for dental treatment in one week was 3.8. During one week, the number of dental outpatients ranged from zero to 786 in 329 nonfederal general hospitals; among this group of responding hospitals, 39 per cent had no dental outpatients during the week and 31 per cent had 50 or more.

Dentists participated on a health team with other professions in 80 per cent of the responding hospitals.

Major disagreements among the health professions as to who should perform certain oral surgical procedures were reported by about 10 per cent of the hospitals in which dentists were members of the health team. Disagreements with plastic surgeons were mentioned by more than one third of these respondents. Otolaryngologists were mentioned next most frequently.

The mean number of dental chairs in responding hospitals was 3.9. Federal hospitals had a higher number of chairs, 7.6, than hospitals under other auspices. Hospitals with 500 or more beds had a mean of 6.1 chairs as opposed to 2.2 chairs in hospitals with less than 50 beds. About 10 per cent of the hospitals had no dental chairs.

Almost 40 per cent of the participating hospitals reported plans for expanding the dental departments.

Dental research programs were being conducted in 187 of the participating hospitals.

Bureau of Economic Research and Statistics, 222 East Superior Street, Chicago 11, Ill. Survey of hospital dental departments. VI. Summary. *J.A.D.A.* 63:313-316 Aug. 1961

## *Undergraduate*

### **Need for more dental education facilities**

A recurring theme of the summary report issued by the Commission on the Survey of Dentistry is the crucial importance of education to the solution of the most serious problems confronting the dental profession and the public.

The task of assuring good dental health for the citizens of this country can be shared by many groups. Though the dental profession has the right and responsibility of leadership, the public has the duty to support the dental profession in finding solutions and in making them work.

The greatest value of the Commission's report lies in the objectivity, candor and practicality of its analyses and recommendations. The Commission offers a fresher viewpoint and a broader perspective. To consider individual professional problems from another's vantage point is helpful, for often dentists need to be reassured that deep concern and long familiarity with the issues have not blinded them to obvious solutions. The Commission's estimates of the seriousness of the dental manpower shortage not only substantiate what dental organizations and government agencies have said before, but indicate that the shortage may be even greater than anticipated. These new estimates remove any basis for denying, as some people have, that there is any dental manpower problem to overcome. If American dentists had not scored impressive gains in their own efficiency, if they had not begun to employ auxiliary personnel more extensively and with greater effectiveness, the manpower shortage already would be felt by the public, and critically felt. Increased efficiency has momentarily cushioned us against the impact of a shortage of dentists, but the margin for improved efficiency is narrowing.

Only some 40 per cent of the public are receiving anything approaching adequate dental care. This is neither as good as the country needs nor the best it can expect. The entire conception of health and the health services has been changing. Adequate health protection is not the special privilege of a fortunate few but the right of all.

The President has recommended that over a ten year period the federal government make available 750 million dollars for the construction and renovation of dental training facilities; 60 million dollars a year would be provided on a two for one matching basis for the construction of new facilities (15 million dollars for new dental schools and 45 million dollars for medical schools). An additional 15 million dollars would be available annually on a one for one matching basis to provide for the renovation of existing dental and medical teaching facilities.

The author has introduced legislation which calls for a federal contribution of 100 million dollars a year for the construction of new dental and medical schools and 25 million dollars a year for improvement and expansion of existing facilities. Although these proposals offer more federal aid than the President's, they also require more financial support at the state and community level.

Controlling circumstances becomes increasingly difficult as society becomes more complex. Today the members of all professions find themselves involved in activities which a few years ago did not even exist. Laymen and professional men must meet together to discuss mutual problems. We must accept the fact that we cannot limit our vision to the merely convenient or tailor the future by a pattern fitted only to the past. We must train more professional people and we must train them better. Perhaps we must even train a new breed of men—men of broader vision and greater scientific depth than we have ever known. In a field as essential as dentistry, we must at least forego the luxury of a narrow vocationalism in our educational processes.

Fogarty, John E. House of Representatives, Washington, D.C. To educate and to be educated. J.A.D.A. 63:1-7 July 1961



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dental research



## Therapeutics

### Control of pain in patients reacting from light planes of anesthesia

The introduction of intravenous barbiturate muscle relaxants combined with nitrous oxide-oxygen made feasible a lighter plane of anesthesia and shortened recovery time. However, because patients began to recover consciousness sooner, they manifested more pain. Two technics were used in an effort to overcome this disadvantage: (1) administer a sedative and antinauseant and an analgesic and antispasmodic just before completion of the operation, or (2) permit the patient to react and then provide medication for the relief from pain.

In preliminary studies by the authors, a number of patients were given either 50 mg. of meperidine hydrochloride or 10 mg. of morphine within 30 minutes of termination of the surgical procedure. These doses did not afford adequate relief from undesirable symptoms; larger doses led to respiratory and circulatory depression in some patients. The authors tried the intramuscular use of 25 and 50 mg. of promethazine hydrochloride, and 25 to 50 mg. of meperidine hydrochloride. The 50 mg. doses proved more advantageous, and respiratory and circulatory depressions were inconsequential.

Based on the preliminary studies, two separate procedures were initiated. In the first procedure, the patients received the combined medication (50 mg. each of promethazine and meperidine) from 20 to 30 minutes before completion of the operation; in the second procedure, the combined medication was given to the patients after they had reacted in the recovery room and when they required relief from pain.

Manifestations of pain or severe pain on reacting from the lighter planes of anesthesia were eliminated for 147 of 150 patients (98 per cent) by the combined intramuscular administration of 50 mg. of promethazine and 50 mg. of meperidine from 20 to 30 minutes before completion of the surgical procedure and cessation of the anesthetic.

In a control group of 150 patients who did not receive any medication before termination of the operative procedure, 37 (25 per cent) had manifestations of severe pain and restlessness on reacting.

Similar results were obtained by administering the same combined medication in the recovery room after the patient had reacted and required relief from pain. In 512 patients in this group, 485 (95 per cent) obtained complete relief from pain.

The medication was effective within a maximum of 35 minutes after administration, and usually was accompanied by extreme drowsiness or sleep. The duration of the effect of the medication varied from 1.5 to 12 hours, the average duration being from 2 to 4 hours.

The combined medication afforded adequate relief from pain without any respiratory or circulatory depression. A disadvantage was the slightly longer reaction time which made it necessary for the patient to remain longer in the recovery room—a small price to pay for quiet, pain-free emergence from anesthesia.

Monheim, Leonard M., and Fisher, Albert J. School of Dentistry, University of Pittsburgh. Postoperative procedures to control pain of patients reacting from light planes of anesthesia. *Anes. & Analg.* 40:404-407 July-Aug. 1961

### Placebo effect in psychiatric drug research

A review of between 500 and 600 publications on a leading tranquilizer indicates that only 37 of these studies meet minimum standards of scientific acceptability. Many clinical investigators and journal editors appear undismayed by this overwhelming evidence of substandard research.

This investigation was designed to measure placebo effect in a psychiatric hospital environment, where not only the patients but also the psychiatrists and nurses would be unaware of the real nature of the study. It appeared to the 120 patients, the psychiatrists and nurses, that a new tranquilizer and a new energizer were to be evaluated. Both drugs actually were placebos.

According to uncontrolled and subjective methods of evaluation, 53 to 80 per cent of the patients were said to have benefited from the "drugs" for an average of 2.6 to 4.9 of the 6 weeks they were taking them.

An objective approach to evaluating the two "drugs" also was employed, involving the use of matched control groups and objective rating procedures. According to this method of evaluation, significant but temporary improvement was caused by the tranquilizer but not by the energizer "drug."

The results are no less impressive than those reported on real drugs in many similar studies in the literature. There is little doubt that if the value of the two placebos had been enhanced by some such appellations as "Quietel" and "Moodex," they might soon constitute, as clinical investigators are prone to say, "welcome additions to the clinical armamentarium."

The tendency to ascribe improvement to what were considered to be active drugs, and the discrepancy in one experiment between the controlled and the uncontrolled methods of evaluation, dramatically illustrate the dubious value of studies which do not employ double-blind and other controlled procedures in evaluating new psychopharmacologic agents.

The double-blind procedure is a necessary, but not a sufficient, condition for a drug study to be defensible scientifically. Other essential requirements include randomization, operationally defined assessment instruments and appropriate statistical analysis.

Loranger, Armand W.; Prout, Curtis T., and White, Mary Alice. New York Hospital, Westchester Division, White Plains, N.Y. The placebo effect in psychiatric drug research. *J.A.M.A.* 176:920-925 June 17, 1961

### **Therapeutic effect of bioflavonoids in gingival inflammatory conditions**

Thirteen patients with gingival hemorrhage were given one or two capsules of duo-C.V.P. (200 mg. water-soluble bioflavonoids and 200 mg. ascorbic acid per capsule) two to three times daily for periods ranging from 11 days to 10 months. Blood dyscrasias and serious debilitating diseases were eliminated as causes of hemorrhage on the basis of consultations with the patients' physicians, and laboratory tests. The patients ranged in age from 9 to 36 years. Kodachrome photographs were taken at the beginning, during and at the end of the period of observation, and biopsy specimens from the gingiva were taken

from some patients. No dietary changes or changes in oral hygiene were suggested, nor was any local therapy given.

Seven other patients, 7 to 29 years old, in a double-blind study were given placebos or active medication, one or two capsules three times daily, for periods ranging from six days to two months.

Every patient given the active medication responded with complete arrest of oozing of blood and hemorrhage, and with regression of the gingival lesions. Early signs of clinical improvement in persons with chronic forms of periodontal disease were seen after about two weeks of medication; results were more dramatic in patients with acute gingival hemorrhage.

In six patients followed subsequent to the study, discontinuation of medication resulted in relapses with recurrence of gingival bleeding and, in some instances, in necrotizing acute gingivitis. When medication was resumed, bleeding stopped. In one patient, medications were rotated during the double-blind study; improvement occurred each time the active preparation was given, and there was a relapse each time the placebo was given.

In all patients, there was either a small intake of fruits and fresh vegetables, or none were eaten.

Water-soluble bioflavonoids were used therapeutically in the belief that bleeding gingiva in the patients studied resulted from increased capillary permeability and fragility, possibly because of damage to the intercellular cement substance in the capillary wall, and in the further belief that the water-soluble bioflavonoids (which have been shown to decrease experimentally induced increased capillary permeability and migration of leukocytes through the capillary wall) may act on the intercellular cement.

The few biopsies taken revealed reduced vascularity and inflammatory infiltration after treatment and clinical improvement. Changes in the endothelial layer of the capillary wall could not be detected. The results do not permit any conclusion with regard to the role of changes in the endothelial cells of the capillary wall in the improvement following therapy.

(See comment in news and notes.)

Carvel, Rosa Iusem, and Halperin, Victor. Loyola University Dental School, New Orleans, La. Therapeutic effect of water-soluble bioflavonoids in gingival inflammatory conditions. *Oral Surg., Oral Med. & Oral Path.* 14:847-855 July 1961

### Oral lesions of the mouth treated with gamma globulin

Poliomyelitis-immune globulin (human), also known as gamma globulin, contains significant concentrations of the antibodies that are useful in the attenuation or prevention of poliomyelitis, measles and infectious hepatitis. Encouraging results from the administration of pooled gamma globulin in patients with herpetic oral lesions have been reported by Streat and others (1958) and Ramfjord (1960). Since gamma globulin taken from a large pool of blood presumably contains antibodies against other infectious agents, an attempt was made to test its effect in the treatment of herpetic lesions, with encouraging results.

In the present study, gamma globulin was used in the treatment of four patients with herpetic lesions of the oral cavity, two patients with aphthous ulcers and aphthous stomatitis, and two patients with erythema multiforme exudativum. Treatment usually consisted of one or two injections intramuscularly of 5 cc. gamma globulin, or one injection of 10 cc. gamma globulin. In no patient was more than 30 cc. used. In most instances the oral lesions disappeared within five days.

The rapid improvement shown by all patients after treatment is encouraging and seems to warrant further clinical trial and observation.

Claus, Everett C.; Urban, Balint, and Hiatt, William. Veterans Administration Hospital, Denver, Colo. Treatment of ulcerative lesions of the oral cavity with gamma globulin. *Oral Surg., Oral Med. & Oral Path.* 14:882-890 July 1961

### Leukergy associated with drug allergy

The tendency of leukocytes to form clumps containing from 3 to over 50 cells is termed "leukergy." This condition has been observed in various pathologic instances, especially inflammations, in animals and man.

Leukergy depends on biochemical changes in the leukocytes consisting of increased levels of glycogen and alkaline phosphatase.

Leukergy is mainly observed in infectious diseases and inflammatory processes but it may occur after hemorrhage, shock, epileptic seizure or physical overwork.

The present study is concerned with leukergy as a reaction to drugs administered routinely in dental and medical practice. Twenty-five patients with established drug allergy were investigated at the Postgraduate Medical School in Warsaw, Poland. There were 17 women and 8 men, ranging in age from 17 to 63 years. The most frequently observed allergic symptoms were urticaria, erythema and high body temperature. In several instances, edema of the face and the oral cavity had occurred. In two instances, the only allergic manifestation was eosinophilia.

The observed allergic reactions were caused by the following drugs: cibalgine, amidopyrin, chlortetracycline, chloramphenicol, oxytetracycline, procaine-penicillin, zinc-insulin, ACTH, iodine and methylthiouracil. In two dental patients, allergy to penicillin was proved, and in two other patients there was suspicion of penicillin allergy.

Citrated blood taken from finger tips (0.2 ml. of blood with 0.05 ml. of citrate incubated for three hours at 37°C.) was examined. From each blood sample two or three slides were made. On each slide 500 leukocytes were counted and the percentage of clumped white blood cells calculated. The blood samples usually were taken on the second day (in a few instances on the third or fourth day) after the appearance of the first allergic symptom. From three to eight blood examinations were performed.

Leukergy became evident in all instances of drug allergy. The immunologic reactions were traceable to the drug administered and the leukergy was closely associated with the development of the immunologic reaction.

It can be assumed that leukergy is a part of an alarm reaction caused by different stress factors, triggered by an antigen-antibody reaction. Infection, inflammation and other pathologic conditions in which leukergy occurs, can be considered as specific stress factors, causing biochemical changes within the leukocytes. Cellular resistance mechanisms mobilized during the initial stage of drug allergy—that is before the human organism is able to produce specific antibodies, are probably involved in the development of leukergy.

Kasperlik, Anna. Postgraduate Medical School, Warsaw, Poland. Leukergy in drug allergy [in English]. *Polish M.Sci. Hist.* 4:20-21 Jan. 1961

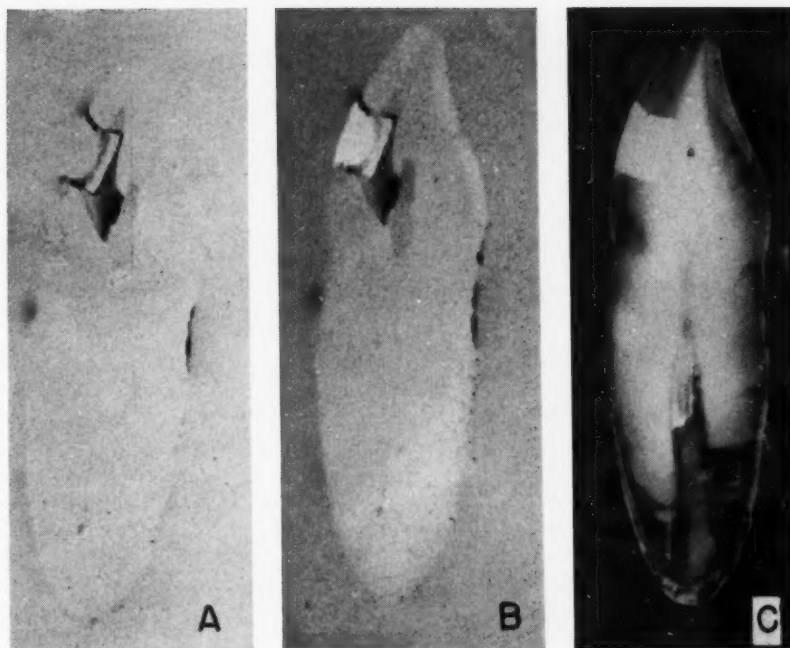


Figure 1 Class V silver amalgam restoration placed over a thick base of zinc phosphate cement in a freshly extracted lower incisor was immersed in a radioactive solution for 24 hours. A central slab about 1.0 mm. thick was cut. A = routine survey autoradiograph. B = roentgen ray image of the tooth slab superimposed on a similar autoradiograph. C = a lightgram of the tooth slab

## Histology

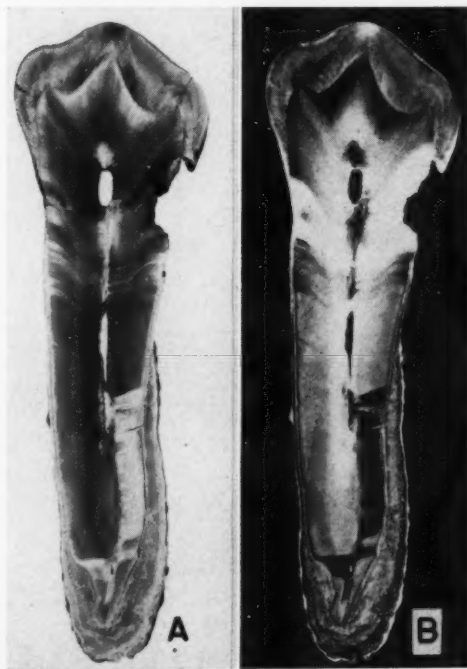
### Roentgenograms and lightgrams as supplements to autoradiographs

Autoradiographs made on standard dental x-ray film for detecting the path of radioisotope penetration into tooth structures or around the margins of restorations have not been completely satisfactory, because of the coarse grain and the difficulty in locating exactly the position of the isotope in relation to the tooth structure.

Two technics have been developed to supplement such autoradiographs. One technic utilizes roentgen ray radiations, and the other utilizes light emissions to produce images of the tooth slab on x-ray film and thus facilitate location of the isotope.

The first technic superimposes a faint roentgen ray image of the tooth section over the autoradiograph, as suggested by Becks (1952). In Figure 1, a comparison of A with B shows that a sharper outline of the pulp, dentinoenamel junction, restoration and the entire tooth slab is obtained by the addition of the roentgen ray image.

Figure 2 A = photomicrograph of ground section about 120 microns thick. B = a lightgram of same specimen. Note the almost perfect reproduction of histologic detail. Note carious lesions in mesial and distal cervical areas, which were deeply pigmented in original section, and sclerotic dentin covered by secondary cementum in apical area of tooth





After the tooth specimen had been immersed in the isotope, a planoparallel center slab about 1 mm. thick was cut and placed (in the dark room) on a dental x-ray film (Minimax, extra fast) and pressed into tight contact with a plastic holder. Then the specimen was placed in a light-tight container for 24 hours, to produce a routine autoradiograph. However, before the film was removed for developing, the specimen in the light-tight box was taken to a dental x-ray machine and exposed to roentgen ray radiations for 4 seconds at 60 kvp, 10 ma., at a 48-inch target distance. The film then was developed in the usual manner. This caused a roentgen ray image of the tooth slab to be superimposed over the autoradiograph, as shown in Figure 1, B, and more accurately outlined the enamel, dentin, cementum and pulp, as well as the margins of the restoration, than was possible by the autoradiograph alone. The roentgen ray image also tended to reduce slightly the halo caused by the long exposure to the isotope radiations.

The second technic produces a detailed, histologically accurate picture of the tooth slab on dental x-ray film (Fig. 2). This was done by exposing the specimen on the x-ray film to light instead of to the roentgen rays or isotope radiations.

The tooth slab was placed on a dental x-ray film (Minimax, extra fast) in the dark room as for an autoradiograph, but compressed lightly between two clean glass slides. A point source of light was used, mounted overhead at least 24 inches directly above the specimen. The specimen on the film was exposed in an otherwise completely dark room for about 0.4 of a second. The exposed x-ray film then was developed for five minutes, washed, and fixed. The resulting "lightgram" is shown in Figure 2, B.

Excellent details of the structure of the tooth slab are produced by this technic. It eliminates the need for more tedious and expensive photomicrographs and permits routine comparison of the autoradiograph with the specimen image. The sharpness of the image is greatly improved in thinner sections (compare Fig. 2, B, and Fig. 1, C).

Going, Robert E.; Massler, Maury, and Dute, Harold L. Veterans Administration Hospital, Hines, Ill. Use of roentgenograms and lightgrams as supplements to autoradiographs of tooth sections. J.D.Res. 40:232-234 March-April 1961

## Dental materials

### An evaluation and comparison of porcelains fused to cast metals

Two basic types of cast metal-porcelain technics are used in dentistry. In type A, porcelain is fused to the platinum palladium group of alloys—the "high-fusing" technic. In type B, porcelain is fused to gold alloys—the "low-fusing" technic.

The combinations of materials tested were: (1) 10 per cent iridium and platinum and Apco 1,875°F. porcelain, (2) Permium 27 alloy with 2,100°F. Permadent porcelain, (3) Permium 22 alloy with 1,800°F. Permadent porcelain, (4) Micro-Bond alloy and regular Micro-Bond porcelain, (5) Micro-Bond alloy and vacuum Micro-Bond porcelain, and (6) Improved Ceramco gold and Ceramco porcelain.

The force needed to break the porcelain from the metal ranged from 630 pounds per square inch (psi) for Permium 22 with Permadent 1,800°F. porcelain to 3,330 psi for Micro-Bond alloy with vacuum Micro-Bond porcelain.

The impact strength force required to crack the porcelain ranged from 117,000 dyne-centimeters for Permium 22 with 1,800°F. porcelain, to 411,000 dyne-centimeters for 10 per cent iridium and platinum and Apco 1,875°F. porcelain. The impact strength force required to shatter the porcelain ranged from 293,000 dyne-centimeters for Permium 22 and 1,800°F. porcelain to 559,000 dyne-centimeters for Micro-Bond alloy and vacuum porcelain.

All materials tested were examined for coefficient similarity and the expansion curves of all the tested materials were within acceptable limits.

Of the materials and technics tested, the higher-fusing porcelains and metals are stronger, more stable, and present the greatest technical latitude. They are preferable, although the equipment, handling and time consumed are more extensive.

The office phase of technics of porcelain fused to metal is critical to the success of the restorations. Preparations and careful examination of the

fit of the metal and of the biscuit bake should be performed uncompromisingly. The dental laboratory entrusted to fabricate such a prosthesis should have well trained technicians and be equipped to complete the laboratory phase of construction without a technical flaw.

Silver, Milton; Klein, George, and Howard, Michael C. 75 East Fifty-fifth Street, New York 22, N.Y. An evaluation and comparison of porcelains fused to cast metals. *J.Prost.Dent.* 10: 1055-1064 Nov.-Dec. 1960

### A new plastic filling material

The physical properties of a new plastic filling material were compared to those of a self-curing acrylic resin filling material. The new material, Cadurit, is an aziridino polyester supplied in paste form, to which an organic sulfonic acid ester is added to initiate polymerization. Physical properties assessed were ash content, dimensional change during polymerization, thermal coefficient of linear expansion, surface hardness, compressive strength, water absorption and marginal percolation.

Although the physical properties of Cadurit and acrylic resin are similar, some small differences were detected. Both resins had a similar linear change due to polymerization shrinkage, but the new material remained stable after 24 hours whereas the acrylic resin continued to contract slightly. The coefficient of thermal expansion of both materials was similar and was seven times that of tooth structure. This caused marginal percolation of fluids around the resins when they were inserted into cavities cut in extracted teeth and submitted to temperature changes.

The surface hardness and compressive strength of the acrylic resin were slightly higher than those of the aziridino polyester resin. During the water absorption tests on this new material it was noted that different results were obtained with specimens having a different surface area per unit gram of material. The highest surface area per gram of material was obtained by using a thin flat disk of 50 mm. diameter; after five days an increase in weight of 5 per cent was recorded. Cylinders of the new material measuring 12 mm. high and 6 mm. in diameter increased in length by just over 1 per cent after immersion in distilled water for 35 days. This increase in length was more than

double the polymerization shrinkage but did not appear to improve the fit of the restoration during the marginal percolation tests.

Cadurit is in its early stages of development and the manufacturer's statement that the material has no monomers and is less toxic than the methacrylates may lead to interesting improvements in the physical properties of filling materials for anterior teeth.

Although Cadurit appears to have no advantages as regards its physical properties over acrylic resin, further research may reveal clinical properties which may make the new material a useful addition to the dentist's range of filling materials.

McLean, John W. University of London, London, England. Some physical properties of a new cross-linked plastic filling material. *Brit.D.J.* 110:375-380 June 6, 1961

### Dimensional properties of silver amalgams

Composition, dimensional changes (under different conditions), flow, mixing and processing of various brands of silver amalgam alloys (commercially available in Switzerland) were investigated at the Dental Institute of the University of Zurich.

The results of these investigations which were based on the American Dental Association Specification No. 1 for Dental Amalgam Alloys (1937) and on the Fédération Dentaire Internationale Specification (1957) led to the following conclusions:

1. Preamalgamation facilitated and speeded up the mixing process of the dental amalgams with a higher silver content.
2. Decrease in the size of particles promoted the homogeneity of the silver amalgam restorations, whereas an excessive decrease in the size of particles adversely affected the dimensional stability of silver amalgam restorations.
3. No untoward effects on the physical properties of the set silver amalgam fillings were observed.
4. Mechanical mixing (performed according to the manufacturer's instructions) facilitated and speeded up the amalgamation. All brands of silver amalgams were ready for condensation about three minutes after trituration was initiated.

5. No decrease in the size of particles was observed during the time of the mixing process.

6. Mechanical condensation of silver amalgams cannot be recommended because of the resulting decrease in the size of particles and overtrituration. Initial contraction was not sufficiently compensated for by the ensuing expansion.

7. Manual condensation appeared to be superior to mechanical condensation, if an even pressure (650 Gm. per square millimeter) was applied throughout the process, and if there was sufficient excess amalgam to provide an even mix from bottom to top of the restoration.

8. Creating the oral environment as close as possible in the laboratory experiments yielded less favorable physical properties of the silver amalgam restorations than were produced previously in conventional industrial tests. The sampling, inspection and testing procedures applied in the Zurich investigation, therefore, produced more conclusive results for the selection of a silver amalgam alloy.

9. Tests performed directly in the mouth of the patient revealed that the texture and outline of the cavity lining were as decisive as the quality of the silver amalgam brand used and the filling technic applied. The principles of cavity preparation, as outlined by G. V. Black, have by no means lost their validity. Flat bottoms and gingival shoulders appeared to be superior to rounded and uneven surfaces. The lining material (phosphate cement) which was used proved to be able to withstand the pressure of condensation.

The responsibility for the quality of a silver amalgam restoration rests primarily on the manufacturer for the production of an alloy according to the specifications, and secondarily on the dentist for the proper manipulation of the silver amalgam alloy and the correct preparation of the cavity.

The international testing of dental silver amalgam alloys (and that of other dental materials), however, has only a limited value for the Swiss dental profession, because only a few of the brands of dental materials available in Switzerland have as yet been investigated or certified in other countries.

The testing of dental amalgam alloys depends also on other factors than those inherent in the dental materials themselves such as (1) the possi-

bility of the importation of untested or not sufficiently tested amalgam brands; (2) the different states of education of the dental profession in the various countries; (3) the different average standards in dental practice in various countries, and (4) the different financial capacity of the individual patients.

The afore-mentioned factors undoubtedly must influence greatly the quality of the silver amalgam brands used in routine dental practice, as well as the technics of processing the materials selected into dental restorations.

E. Dolder, Dental Institute of the University of Zurich, Zürichbergstrasse 4, Zurich 28, Switzerland. Das Silberamalgam und die Probleme der Materialprüfung. Schweiz. Mschr. Zahnhe. 71:153-185 March 1961

### Zinc oxide-eugenol mixtures

To determine the influence of selected additives on various physical properties of zinc oxide-eugenol cements, 26 mixtures of zinc oxide and eugenol with various agents added in varying combinations and concentrations were tested. Physical properties studied included compressive strength, solubility, film thickness and setting time.

Addition of o-ethoxybenzoic acid (EBA), if in approximately equal parts with eugenol, produced significant increases in compressive strength. It simultaneously increased solubility and decreased the setting time. Solubility also increased slightly with the addition of silica and zinc acetate. Addition of polystyrene was more effective in increasing the strength when present in mixtures containing EBA.

Zinc oxide produced from the thermal decomposition of zinc carbonate did not increase the strength of the mixtures studied but did decrease the setting time and tackiness of the mix.

The addition of fused silica improved the handling characteristics of the mixtures when in a concentration of at least 10 per cent in the powder.

Substitution of methyl methacrylate for polystyrene increased the stability of the solution and had an effect comparable to that of polystyrene on strength and solubility.

Zinc acetate effectively accelerated the set of all mixtures.

The exact effect of agents added to mixes of

zinc oxide and eugenol depends on the combination employed and the property being evaluated. Further research may make possible materials of this type having physical properties comparable or superior to zinc phosphate cements.

Phillips, Ralph W., and Love, Dwain R. Indiana University School of Dentistry, Indianapolis, Ind. The effect of certain additive agents on the physical properties of zinc oxide-eugenol mixtures. *J.D.Res.* 40:294-303 March-April 1961

## Anesthesiology

### A molecular theory of general anesthesia

Consciousness and ephemeral memory (reverberatory memory) probably involve electric oscillations in the brain. Permanent memory probably involves a material pattern in the brain, in part inherited and in part transferred to the material brain from the electric pattern of the ephemeral memory.

The electric oscillations of the brain become evident in a crude way in electroencephalograms. There is some evidence that the ephemeral memory, with an effective life that rarely is longer than a few minutes, is electrical.

Loss of consciousness such as occurs in sleep or in narcosis may be the result either of a decrease in activity of the exciting mechanism or of an increase in impedance of the supporting network of conductors, or of both.

It is the author's theory that general anesthetics of the nonhydrogen-binding type, such as cyclopropane, chloroform, nitrous oxide, and halothane, operate by increasing the impedance of the encephalonic network of conductors, and that this increase in impedance results from the formation in the network, presumably mainly in the synaptic regions, of hydrate microcrystals formed by crystallization of the encephalonic fluid. These hydrate microcrystals trap some of the electrically charged side-chain groups of proteins and some of the ions of the encephalonic fluid, interfering with their freedom of motion and with their contribution to the electric oscillations in such a way as to increase the impedance

offered by the network to the electric waves and thus to cause the level of electrical activity of the brain to be restricted to that characteristic of anesthesia and unconsciousness. The formation of the hydrate microcrystals also may decrease the rate of chemical reactions by trapping the reactant molecules. The catalytic activity of enzymes may be decreased by the formation of hydrate microcrystals in the neighborhood of their active sites.

The hydrate microcrystal theory of anesthesia by non-hydrogen-bonding agents differs from most earlier theories in that it involves primarily the interaction of the molecules of the anesthetic agent with water molecules in the brain, rather than with molecules of lipids.

The striking correlation between the narcotizing partial pressure of the anesthetic agents and the partial pressure necessary to cause formation of hydrate crystals provides some support for the proposed theory, although any theory based on the van der Waals attraction (1958) of the molecules of the anesthetic agent for other molecules would show a similar correlation.

The proposed theory is sufficiently detailed to permit many predictions to be made about the effect of anesthetic agents in changing the properties of brain tissue and other substances, and many experiments are suggested by the theory; some of these experiments are being carried out in the laboratories of the California Institute of Technology.

The hydrate microcrystal theory of anesthesia suggests that the anesthetic agents should act on all tissues, and not just on brain and nerve tissue.

Pauling, Linus. Gates and Crellin Laboratories of Chemistry, California Institute of Technology, Pasadena, Calif. A molecular theory of general anesthesia. *Science* 134:15-21 July 7, 1961

### Mepivacaine hydrochloride (Carbocaine): a preliminary clinical study

Mepivacaine hydrochloride was compared with lidocaine hydrochloride in a double-blind study in 200 patients undergoing various oral surgical procedures. The solutions employed were of a 2 per cent concentration without the addition of a vasoconstrictor.

Two per cent mepivacaine hydrochloride without a vasoconstrictor is an effective local anes-



thetic agent, with rapid onset, good spreading characteristics, good depth and duration. The amount of anesthetic solution injected ranged from 1.5 to 3 cc. In block anesthesia with mepivacaine, the average time of onset was two minutes; with lidocaine, three minutes. In infiltration anesthesia, the average time of onset for mepivacaine was 1.5 minutes, for lidocaine 2.8 minutes. Duration of adequate anesthesia in the patients injected with mepivacaine was considerably longer than in the patients injected with lidocaine.

Further studies are indicated and in progress, to determine more accurately the exact perimeters of action of mepivacaine, which may be a useful adjunct to the practice of dentistry, especially for patients with systemic conditions which contraindicate the use of a vasoconstrictor or vasopressors.

Lock, Francis; Vernino, Daniel, and Sadove, M. Research and Educational Hospitals, University of Illinois, Chicago, Ill. Mepivacaine hydrochloride (Carbocaine): a preliminary clinical study. *J.Oral Surg., Anesth. & Hosp.D.Serv.* 19:16-20 Jan. 1961

### Qualitative and quantitative tests for isobucaine hydrochloride

A series of qualitative chemical tests relating to identity, absorption characteristics and purity, and quantitative assay procedures, are presented for isobucaine hydrochloride.

Isobucaine, an ester-type local anesthetic, is a moderately long-acting anesthetic agent.

Both the ultraviolet method and the perchloric acid titrimetric method of analyzing isobucaine appear to be accurate and precise.

Feldmann, Edward G.; Hefferren, John J.; Koehler, Henry M., and Reasenber, Julian R. 2215 Constitution Avenue, N.W., Washington 7, D.C. Qualitative and quantitative tests for isobucaine hydrochloride. *J.Pharm.Sc.* 50:347-350 April 1961

### Experimental parameters in the evaluation of analgesics, I

Pain is not an isolated sensation produced by a specific stimulus. It involves a perception based on highly complex reactions and experiences. The intensity of pain is not always proportional to that of the stimulus. Pain is subjective and individual, and may be modified by various emotional and conditioning factors. Therefore, relief from

pain (analgesia) involves more than an isolated action—more than merely depressing the "pain center" in the central nervous system.

Seven different analgesics were investigated for which claims of relieving moderate types of pain had been made. The specific test procedures used and the rationalization for the use of these drugs in dental and medical practice were based on the following properties of these agents: (1) degree of analgesic activity; (2) effect on voluntary (normal) motor activity in experimental animals (mice); (3) effect on interneuronal blockade or stimulation in experimental animals (dogs), and (4) degree of acute toxicity in experimental animals (mice).

In the first series, the properties of the following three analgesic agents were investigated: (1) phenylramidol (Analexin); (2) codeine, and (3) meperidine (Demerol).

The results obtained from the various tests were plotted on a semilogarithmic basis.

1. Phenylramidol was found to possess a significant degree of analgesic activity (in mice) at relatively low doses. It may produce some depression of the central nervous system, and exhibits profound interneuronal blocking and centrally induced muscle relaxant properties. The acute toxicity curve places the toxic dose of this analgesic well above all effective dosage ranges. In the over-all profile curves, phenylramidol appears to possess moderately potent analgesic activity in man which is evident over a broad range of doses administered. It probably has little central depressant (dulling) effects, but does exert a profound centrally induced muscle relaxant activity. Increased doses produce a relatively slow increase in analgesic activity but a rapid increase in muscle relaxant activity. Toxicity of this analgesic appears to be of little consequence for its use in practice.

2. Codeine does not produce an analgesic effect in as low a dosage range as was found in phenylramidol, but the slopes of the dose-response curves were steeper. The drug caused a decrease in the voluntary motor activity (depressant effect). The dose-response curves extended over a wide dosage range including all doses at which effective analgesic activity was found. However, the analgesic and the central depressant effects could not be separated by variations in dosage.



Although the toxicity curve for codeine is somewhat closer to the effective dosage curve than was observed with phenylramidol, the toxicity level is still well beyond what could be considered dangerous. Increasing doses of codeine produce a fairly rapid increase in analgesic action with a somewhat less rapid, but still considerable increase in depressant (dulling) effects on the central nervous system.

3. Meperidine produces the most acute analgesic activity demonstrated by the dose-response curves. The degree of the analgesic effect reached the level of that of strong (morphinelike) agents. Meperidine produced depression of the motor activity in the same dosage range at which effective analgesia was observed. Increasing doses produced a rapid increase in analgesic action, and a less rapid, but still significant, increase in central depression. However, acute toxicity could be a factor in the drug's utilization in practice, especially in instances of accidental overdosage. [To be continued]

O'Dell, Thomas B. Macon County Hospital, Decatur, Ill. Experimental parameters in the evaluation of analgesics. Chicago Med. 63:9-15 April 15, 1961

### **Dextro propoxyphene, a new nonnarcotic analgesic**

The analgesic dextro propoxyphene is not a narcotic but is reported to be as effective as codeine. The results of studies of the drug in animals and men have been encouraging. The incidence of such side effects as nausea, vomiting, loss of appetite, constipation and abdominal pain is much lower with dextro propoxyphene than with codeine; however, both drugs produce a significant increase in central nervous system effects, such as dizziness, headache, vertigo and nervousness. There is evidence that dextro propoxyphene is nonaddictive.

Dextro propoxyphene hydrochloride is a stable, faintly bitter, white crystalline solid soluble in water. It is quite stable and resistant to hydrolysis either in dry powder form or in solution.

In studies on the effects of continued administration of this drug, 43 patients received the analgesic over periods ranging from six months to two years. The usual amount given orally was 260 mg. of dextro propoxyphene hydrochloride daily in divided doses. No patient showed adverse

changes after injection. No disturbances occurred in liver or kidney functions attributable to the analgesic.

To evaluate the drug for dental use, dextro propoxyphene hydrochloride was administered in a pilot study testing for side effects and failures. Analysis of the results indicated that addition of an antipyretic analgesic to dextro propoxyphene might make the latter drug more effective in acute infections. The pilot study demonstrated that the combination of dextro propoxyphene and acetylsalicylic acid compound offered possibilities of being a worthwhile agent for patients unable to tolerate codeine.

In a double-blind study, dextro propoxyphene compound (Darvon Compound), acetylsalicylic acid compound with codeine phosphate, codeine phosphate alone, dextro propoxyphene hydrochloride combined with acetylsalicylic acid, and a placebo were compared.

Ten patients considered the action of the codeine preparations too short; two, that of dextro propoxyphene, and one, that of the placebo. Twenty-one patients excluded from the double-blind study because of histories of reacting to either salicylate or phenobarbital were given dextro propoxyphene alone; all these patients reported satisfactory pain relief without side effects. Twenty-two patients were similarly excluded from the double-blind study as being unable to tolerate codeine. They were given dextro propoxyphene acetylsalicylic acid compound; 21 reported satisfactory relief, one found it unsatisfactory, and one reported the side effect of nausea.

The double-blind study indicated that dextro propoxyphene is equal to codeine as an analgesic used in dental practice. The oral dose of dextro propoxyphene hydrochloride when given alone to the average adult may be increased to 65 mg.

Dextro propoxyphene hydrochloride appears to be a valuable analgesic that can alleviate pain without great danger of addiction or drug tolerance.

[The 1961 edition of *Accepted Dental Remedies* states in part: "Dextro propoxyphene is similar pharmacologically to codeine. As the hydrochloride (Darvon) it is marketed alone or in combination with acetylsalicylic acid, acetophenetidin and caffeine (Darvon Compound). Its analgesic potency has been equated with that of

codeine but dextro propoxyphene may not be relied upon for consistent relief of severe pain associated with some dental procedures. Its side effects include dizziness, nausea, vomiting and other gastrointestinal disturbances which appear to occur less frequently with this drug than with codeine. Dextro propoxyphene is not subject to the provisions of the Harrison Narcotic Act, and under conditions of use in dentistry there is little liability to addiction. In therapeutic doses this

drug appears to produce little or no central depression and it is therefore not contraindicated in the ambulatory patient.

"Because conclusive evidence for appraisal of their status is not available, the Council (on Dental Therapeutics) has not listed brands of dextro propoxyphene or its combination with other analgesics in *Accepted Dental Remedies*."

Ping, R. S., and Redish, C. H. Indiana University School of Dentistry, Indianapolis, Ind. Dextro propoxyphene, a new non-narcotic analgesic. *J. Indiana D.A.* 40:90-95 March 1961

## Prosthodontics

### A test denture for masticatory studies

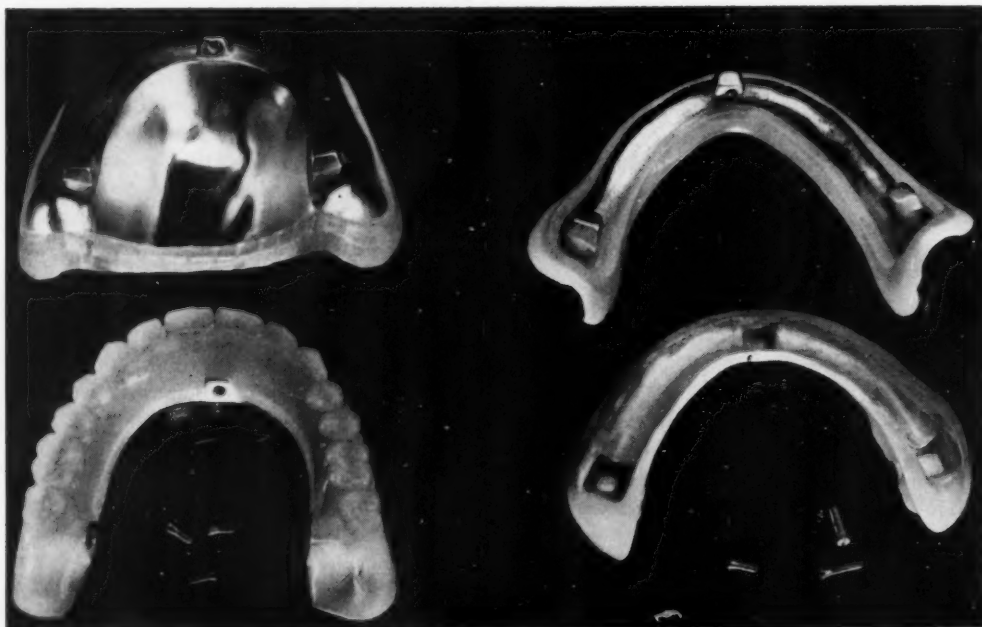
A test denture (Fig. 1), for use in clinically studying chewing efficiency with various designs of artificial teeth, has been constructed. The denture base is made of an aluminum alloy, BA 28. The "alveolar ridge" carrying the teeth is made of

acrylic resin on an aluminum denture skeleton. This part can be attached to the base with almost perfect adaptation through a simple screw lock device.

After the parts of the test denture were cast, they were polished and anodized in a 10 per cent solution of sulfuric acid. The finished denture is shown in Figure 2. The denture is relatively simple and inexpensive to manufacture.

One patient wore such a denture for four

Figure 1 The different parts of the test dentures



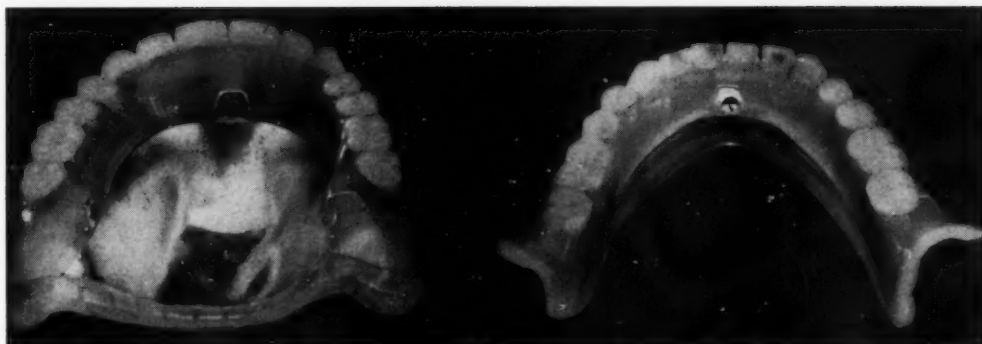


Figure 2 The finished test dentures

months. During the observation period, no objective or subjective symptoms ascribable to the aluminum alloy could be found, nor did the patient complain of discomfort. The fit of the denture was deemed good. The results are encouraging and indicate that the proposed denture design may be used for various clinical studies on chewing efficiency and perhaps for other prosthetic problems.

Bergman, Bo. Tandläkarhögskolan, Stockholm 3, Sweden.  
A test denture for masticatory studies. Svensk tandläk.Tskr.  
54:193-204 April 1961 [In English]

## Miscellaneous

### Air contamination from high-speed dental drills

An investigation was carried out by the Department for Research in Industrial Medicine to determine the extent to which air in the dental office is contaminated by the use of high-speed dental drills. The investigation was restricted to a National Health Service practice and to the dental department of a London teaching hospital. The air turbine drill was used both dry and with a water jet. Samples of air were taken with a konometer as close as possible to the operator's face. Samples taken when the drill was running without water showed an oil concentration of 0.62 mg. per cubic meter of air, and a calcium concentration of 0.047 mg. per cubic meter of air. For comparison, oil concentration in the general atmosphere of a machine shop, where semiautomatic lathes were used, averaged 0.5 to 1.0 mg. per cubic meter of air throughout the day.

Samples of air taken while a conventional drill was in use showed that the concentration of solid particles during drilling was very small. When an air syringe was used to blow out the debris in the cavity, however, a much higher concentration of particles in the air was obtained than at any time during drilling with the high-speed instrument.

Observations on bacterial contamination made during the use of both high-speed and conventional drills revealed a uniform distribution of contaminants, the predominant organisms being *Staphylococcus pyogenes* var. *albus* and a gram-negative bacillus of the aerogenes group. Some periods of drilling were associated with a growth of alpha hemolytic streptococci. These were found following the use of both high-speed and conventional drills, and were the only organisms specifically associated with drilling procedures.

From these observations, it appears there is no increased risk to the operator of bacterial contamination associated with the use of the high-speed drill. Consideration of the composition of the solid particles found in the air does not reveal the presence of any substance that might be considered pathogenic in the concentrations encountered.

The introduction of oil into the lung, however, is by no means innocuous. Oils have the capacity of producing a granulomatous tissue reaction with surrounding fibrosis, producing a hard mass known as an oleogranuloma or paraffinoma. Vegetable oils, if free from fatty acids, rarely produce an inflammatory reaction in the lung.

It is recommended that vegetable oils free from impurity should be used exclusively to lubricate air turbine drills. The minimum quantity of vege-

table oil compatible with efficient running of the drill should be used. If the instrument is used with a water jet there will be an appreciable reduction in air contamination with solid particles.

Kazantzis, G. 1 Wimpole Street, London W.1, England. Air contamination from high-speed dental drills. *Proc. Roy Soc. Med.* 54:242-244 March 1961

### Research and the practicing orthodontist

No other specialty in dentistry has the rigid indoctrination in documenting the progress of treatment that characterizes orthodontics. The taking of impressions and the making of record models is practically the first thing that a future specialist in orthodontics is taught to do. This exercise is followed by a precise method of taking histories and careful roentgenographic records and making studies which add up to important data for evaluation. As a result of this discipline, the orthodontist is well-oriented to the field of dental research; this well may be the reason why so many research contributions not only to orthodontics but to the general field of dentistry, medicine and speech therapy have been made by investigators with backgrounds of orthodontic education.

Research may be divided into two general categories: (1) basic research and (2) clinical research. The methods for attacking a research problem may be divided into four categories: (1) the check-up type of research, (2) a new method in an old field, (3) the empirical method, and (4) the new method. The research process may be considered in the following sequence: (1) survey of prior knowledge or opinions, (2) logical deduction, (3) formulation of a hypothesis, (4) experimentation, (5) evaluation and interpretation of data, and (6) conclusions. The conclusions must be followed by the transmission of information, and this means publication.

The following suggestions are basic in planning a research project:

1. Write down your ideas.
2. Make an accurate statement of the problem.
3. Discuss your plans with one or more other persons.

Bias often is the most serious factor that invalidates an otherwise fine piece of investigative work. When conclusions are drawn from the re-

sults of experiments, it is important to use all the evidence. The investigator must guard against selecting evidence that will tend to prove his hypothesis and neglecting as extraneous evidence that which would tend to create doubt.

As far as the practicing orthodontist is concerned, the question regarding all research findings should be, "Do they work in practice?" The testing of new methods of treatment in practice may be called operational research.

Complete facilities for research are not practical in an orthodontist's office, but adequate facilities for documentation, such as cephalostats and records, are standard. The office activity can be supplemented by the resources of a nearby university orthodontic department, which in most instances are available to interested practitioners who wish to engage in research. The contributions by orthodontists to research must be expanded.

Forrest, Edward J. School of Dentistry, University of Pittsburgh, Pittsburgh, Pa. Research and the practicing orthodontist. *Am.J.Orthodont.* 47:429-438 June 1961

### Psychogalvanic phenomenon

A psychogalvanometer was used to record the electrical agitations produced by emotional stresses in 92 patients attending the dental clinic of the House of Representatives in Japan. The instrument used was an MPL-type galvanometer manufactured by the Yokokawa Electric Works. Each patient was seated in the dental chair; the positive electrode was attached to the back of the left hand and the negative electrode to the back of the right hand. Between the electrode and the skin a piece of gauze moistened in saline solution was inserted. While the dentist provided dental treatment, one research worker read the changes recorded by the galvanometer and a second worker plotted the values. Before each test, the patient's resting current was measured for two minutes, and in some patients the resting current was measured for two minutes after the treatment had been concluded.

Patients who were nervous or anxious about dental treatment showed greater changes in electric current before and during treatment than did patients who were calm. Changes in electric current corresponded to the degree of pain generally. Even the suggestion of pain caused a change in

the electric current, as did the sound of the engine or various vibrations during dental treatment.

Ten case reports with galvanometric tracings illustrate the findings.

Okubo, Shinichi. Dental Clinic, House of Representatives, Tokyo, Japan. Application of psychogalvanic phenomenon at the dental clinic. *Bul. Tokyo D. Col.* 2:13-31 May 1961

### Personality and periodontal disease

Sixty-two psychiatric patients and 40 normal subjects were examined orally to evaluate the incidence of periodontal disease. They also were given a diagnostic personality inventory (Minnesota Multiphasic Personality Inventory) and in addition were interviewed to obtain information concerning the variables in the hypothesized personality profile. The dentist who performed the oral examinations had no knowledge of the emotional status or diagnosis of the subjects, and the interviewer knew nothing about their periodontal condition.

The data do not suffice to establish definitely that there is an important relation between general personality adjustment and periodontal disease. Any such relation that may exist probably is not a close one. The findings do suggest, however, that periodontal disease tends to be associated more closely with broken homes and deficient marital adjustment. The findings also indicate the likelihood that there is a psychogenic component or psychosomatic process involved in at least some instances of periodontal disease.

Baker, Ernest G.; Crook, G. Hamilton, and Schwabacher, Elsbeth D. School of Dentistry, University of California, San Francisco, Calif. Personality correlates of periodontal disease. *J.D.Res.* 40:396-403 May-June 1961

### Growth changes in the relations between basicranial and palatal planes

Growth changes in the relations between the base of the skull and the palate were studied from semilongitudinal series of lateral head roentgenograms of 32 boys and 27 girls. The age range covered was from 6 months to 17 years. The following planes were considered: plane of the foramen magnum, clival plane through basion and the midpoint of the hypophyseal fossa, sphenoidal plane, and the palatal plane. The six angles

formed by these planes were measured and the change patterns analyzed.

A cross-sectional analysis revealed pronounced changes in the angular relations between the planes during the first two years, and practically no changes thereafter. This finding proved to be misleading when the individual growth patterns were inspected. Pronounced changes were found to occur in all the angles at any time during the period covered by the study. No regular correlation between the angles was found regarding the patterns of change.

The study supports the assertion that in the neurocranium "no one bone has a predetermined topographic position" (Moss, 1958).

The concept of a fixed growth pattern of the craniofacial skeleton (which has had a great influence, especially in the field of dentistry) must be rejected on the present evidence of great flexibility of this complex. The use of any rigid norms based on the relations between craniofacial structures in diagnosis, prognosis or classification cannot be recommended.

Koski, Kalevi. Department of Anatomy, University of Turku, Turku 3, Finland. Growth changes in the relationships between some basicranial planes and the palatal plane. *Suomen hammaslääk. toim.* 57:15-26 March 1961 [in English]

### Temperature of cigarette smoke

One of the theories for the genesis of oral leukoplakia and gingivitis stresses the damage by smoke heat during cigarette smoking. The authors manufactured a cigarette holder of ordinary dimensions within which were mounted a thermoelement and a flow meter recording simultaneously the smoke temperature and the smoke flow velocity during smoking of cigarettes. The cigarettes used in the experiments were ordinary (Ritz) Swedish blend cigarettes 70 mm. long. Both normal and artificial smoking were investigated.

Hilding has shown (1956) that ordinary smokers smoke only about 35 mm. of a 70 mm. cigarette.

When such a cigarette is smoked with one puff every 30 seconds, the smoke temperature rises from 23°C. to 31°C. when the burning zone is within the first 40 mm. of the cigarette. When the burning zone is extended further toward the tip,



the temperature of the smoke rises to between 47°C. and 68°C. For the average cigarette smoker, the temperature of the smoke entering the oral cavity is about 30°C.

It can be concluded that heat damage of cigarette smoke on the oral mucous membranes seems highly improbable under ordinary smoking conditions. Mucosal heat damage is more likely to occur, for example, as a result of drinking hot coffee (temperature of 60°C to 65°C.).

Ingelstedt, Sven, and Wallenius, Kjell. University of Lund, Lund, Sweden. Studies on smoke temperature during cigarette smoking. *Acta odont.scandinav.* 19:87-99 May 1961

### Research and development in clinical dentistry

The frenetic stage of affairs with respect to audio-analgesia is illustrated by the fact that in September 1960 there were 12 different machines commercially available, more were on the drafting board, and some already had been withdrawn from the market. The machine itself is an elaborate tape recorder with earphones for the patient. The magic ingredient is "white sound"—defined by a physicist as "the equal distribution of energy across the frequency spectrum." The sound of a waterfall typifies the white sound. There is no unanimity of opinion as to why white sound produces analgesia. The common explanation that white sound so jams the nerve channels that pain cannot be felt disregards the fact that nerve fibers which transmit sound do not transmit pain. A more plausible explanation is that the phenomenon operates at higher levels in the brain; the psychologists call it "attention awareness."

Workers in the field of oral roentgenography have provided clear-cut technical advances. Not so long ago, the taking of 20 diagnostic films might easily have exposed the patient to a total dose of 100 r. Techniques available today can reduce exposure to 1/25th of that amount. Such techniques include collimation, the use of aluminum filtration, full development of correctly exposed films, the use of higher kilovoltages and the use of high-speed films. Other important protective measures include the use of lead aprons over the gonadal areas and the use of shielding to protect

personnel who are working in the dental office.

In orthodontics, the most intriguing development today probably is the use of lighter forces than those applied previously. The use of light forces operating over a long period of time diminishes the likelihood of undesirable effects on the tooth and supporting structures, and makes possible treating patients at less frequent intervals. These light forces are achieved by using wires of smaller dimensions, and by incorporating in them loops which make possible something more than the evanescent storage of force.

Research workers at the University of Indiana, in their work with these lighter forces, have measured the force values accurately and calculated those required to produce the desired movement in a given segment of teeth.

Another important technical development in the field of orthodontics is the indirect fabrication of appliances. Many orthodontists now use impression technics similar to those used in restorative dentistry, to fabricate dies on which technicians can make full-banded appliances. This permits the delegation of work to auxiliary personnel, and increases the number of patients the orthodontist can handle.

In the etiology of malocclusion, heredity seems to be the most important single factor.

The periodontists have been using research technics to learn more about mucogingival surgery and its effect on the attached gingiva. Their conclusions are that a healthy marginal tissue can be produced about a tooth if the tissue is inelastic. This fact has important implications for crown and bridge dentistry, too.

As dentistry is divided and subdivided, little areas are created which then are elevated into specific art forms, losing their significance in terms of health service. If some effort were made to draw together these professional fragments, undoubtedly the service aspects of dentistry would improve. Research as it relates to clinical dentistry would also benefit, at about the same velocity as communication between different areas of interest improves.

Wylie, Wendell L. University of California School of Dentistry, San Francisco, Calif. Research and development in clinical dentistry. *Am.J.Pub.Health* 51:820-824 June 1961

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## *Artificial respiration*

### **Results with external cardiac massage at the Massachusetts General Hospital**

In the past six months, the technic of external cardiac massage was used on 84 patients at the Massachusetts General Hospital. The technic is simple and requires no special equipment. With the patient supine and preferably on a hard surface, the lower sternum is sharply compressed 60 to 90 times per minute with a force sufficient to move it 3 or 4 cm. toward the vertebral column. Although this procedure provides some pulmonary ventilation, it has been the authors' practice to insert an endotracheal tube as quickly as possible to permit intermittent bag breathing. When possible, the volume of the femoral pulse and the size of the pupils should be observed to judge the effectiveness of the cardiac massage. This permits use of the minimum force necessary to obtain effective circulation.

Of the 42 patients in whom data were recorded, only 4 were noted to have weak pulses during external cardiac massage. The remaining 38 evidenced adequate circulation as judged by the presence of a strong femoral pulse or the maintenance of normal pupillary size. In a few patients in whom blood pressures were measured during massage, levels up to 120 mm. of mercury were recorded.

The impression is that better pressures are obtained with closed-chest cardiac massage than with open-chest massage.

An effective, spontaneous heartbeat and palpable pulse were restored in 36 of the 84 patients for more than a few minutes and, in some of these patients, for several years. Ten of 18 patients with ventricular fibrillation were defibrillated successfully and a spontaneous heartbeat restored. This was achieved by externally placed electrodes in six patients, and by electrodes placed directly on the heart in four patients.

Recovery of consciousness occurred in 15 of 81 patients; 23 patients survived for over three hours; 19 of these died of a variety of causes re-

lated to their underlying disease 3 hours to 13 days later. Four patients left the hospital in good health. The small number of ultimate survivors probably is attributable to the nature and extent of the diseases involved.

Postmortem examinations were done on 46 patients. Rib fractures, involving two to eight ribs, occurred in 15 patients. Probably rib fracture can be minimized if care is taken to exert pressure only over the sternum and to use no more pressure than is necessary to maintain an effective pulse. Four patients were found to have hemothorax. Hemopericardium was noted in two patients and was not associated with rib fractures. No evidence of rupture or other injury of the myocardium was seen, in contrast to findings often reported after open cardiac massage. Five patients had 50 to 500 ml. of blood in the peritoneal cavity; in three patients this was related to subcapsular hematomas of the liver; in two patients large lacerations of the liver were observed. Five patients had extensive bone marrow emboli in the pulmonary arteries.

Although external cardiac massage entails some serious complications, the possible benefit outweighs the risk of these complications if the diagnosis of circulatory arrest has been established with reasonable certainty. It is evident that this procedure is generally successful in maintaining an effective circulation, thus allowing time for additional equipment and personnel to be mobilized. The simplicity of the procedure permits its use under conditions in which thoracotomy and internal massage would not be feasible.

Baringer, J. Richard; Salzman, Edwin W.; Jones, Wallace A., and Friedlich, Allan L. Massachusetts General Hospital, Boston, Mass. External cardiac massage. *New England J. Med.* 265:62-65 July 13, 1961

### **Successful resuscitation after cardiac arrest**

An instance of successful resuscitation after cardiac arrest in the dental chair illustrates that a life can be saved by appropriate resuscitative measures even in the mundane surroundings of a dental surgery.

A 13 year old boy was seen in the oral surgery department of the Newcastle Dental Hospital for the extraction of a lower first molar. It was ascertained that he was in good health and had no

medical history of consequence. For several days before his dental appointment, the boy had shown inordinate concern at the prospect of a tooth extraction.

Induction of anesthesia was difficult, as the uncooperative patient struggled. A quiet and satisfactory condition was secured only after supplementing the nitrous oxide-oxygen with trichloroethylene. The insertion of the pack may have disturbed the patient because resistant and purposeful movements recurred immediately. To control the situation, ethyl chloride was sprayed directly on the pack. Forceps were applied to the tooth, but the crown fractured. Before the extraction could be completed, the boy became pale, with cyanosed lips. Respiration ceased, and rapid examination by the dentist revealed a weak, slow pulse. Immediately, the chair was tilted to the head-down position. Artificial ventilation with 100 per cent oxygen was commenced, together with rhythmic pressure on the lower chest, with no response. Peripheral pulses were absent and on brief auscultation, no heart sounds were heard. The pupils were widely dilated.

Open-chest cardiac massage was applied, and a cuffed endotracheal tube inserted and inflation of the lungs performed by manual compression of the rebreathing bag of a Boyle's machine. No carotid pulse was felt. The child appeared to be dead and the heart was found to be dilated in asystole.

From the onset of the initial collapse to exposure of the heart, nine minutes had elapsed. After about four minutes of massage, 1 ml. of 1:1,000 epinephrine was injected into the left centricle and cardiac massage continued. Soon the heart began to beat spontaneously; 500 mg. of double-strength plasma was given intravenously and a general surgeon repaired the chest wound and arranged underwater seal drainage. The child was removed to the Royal Victoria Infirmary about an hour after collapse, without regaining consciousness. He was subjected to hypothermia without delay; his temperature fell in an hour to 31°C. and was controlled throughout the night at near that level. Shivering was controlled by the administration of nitrous oxide-oxygen and ether. To maintain a high blood sugar content, 10 per cent dextrose was given intravenously. Twenty-six hours after admission, the level

of unconsciousness lightened and two hours later the boy opened his eyes, swallowed and moved his legs. Cooling and drugs were discontinued after 65 hours. He was discharged from the hospital, apparently well, 21 days after admission.

Electroencephalographic tracings were made at various stages of his treatment to detect possible brain disturbance, but all findings were within the limits of normality. Three months later, the residual tooth roots were extracted.

The sequence of events which produced this mishap in the dental surgery is a matter of conjecture.

Kay, L. W., and Inkster, J. S. Sutherland Dental School, Newcastle upon Tyne, Northumberland, England. Cardiac arrest in the dental chair. *Brit.D.J.* 111:18-21 July 4, 1961

## History

### Dentistry in colonial medical almanacs

In the 13 American colonies, the relatively small number of medical and dental practitioners, and the fact that the rural population was spread over an extensive area, led to the widespread popularity of almanacs. More than 1,500 almanacs were published before 1783, in English, German, Dutch and French. The almanacs were issued as small, duodecimo booklets. They had a vast influence, finding their way into the remotest homes and supplying a reading public which could not be reached by newspapers, medical or general literature. The almanacs overshadowed all other publications of the period.

Most of the almanacs had a section on astrological medicine, accompanied by illustrations depicting the influence of the signs of the Zodiac on the various portions of the human anatomy, together with indications as to the best times of the year for bleeding and cupping. In most instances, the colonial almanacs also contained small treatises on domestic medicine. They dealt with care of the teeth, the treatment of smallpox, diphtheria, consumption, gout, rheumatism, rabies, yaws and syphilis (sometimes referred to as scurvy). Articles on *materia medica* contained

information culled from European herbals, original descriptions of the properties of indigenous American medicinal plants, therapeutic procedures discovered by Negroes, and information on veterinary medicine and the control of epizootics. They also carried the first advertisements for patent medicines.

References to dental matters in the almanacs related to the cure of toothache, cleaning and scaling of the teeth, dentifrices, tooth fillings, scurvy in the gums, regulation and growth of the teeth, and to halitosis resulting from oral infection.

The first dental remedy to appear in an almanac was in *The New-England Almanack for 1695*, inserted by Dr. Christian Lodowick under the month of August, the recipe being "To prevent the toothach & Keep the teeth sound." In his *Almanack for 1738* Nathaniel Whittemore offered the second recipe, "To cure the Tooth Ach." The third was by Titan Leeds in *The American Almanack for 1742*, and this was followed by other

contributions from Christoph Saur and Thomas More. In the *Almanac for 1752* More referred to toothache, and discussed the dental problems relating to children's teeth. Recipes for the cure of toothache were contributed by John Tobler in *The South-Carolina Almanack for 1756* and 1767.

"The Cure for Toothache" by Mr. Van Aken, an apothecary from Sweden, was published in *Poor Roger's Almanack for 1767*. Other remedies appear in *Poor Richard's Almanack for 1767*.

*Freeman's New York Almanack for 1768* contained "Rules for the preservation of the teeth and gums," in which reference was made to the enamel of the teeth and to measures to be taken for its protection. *Poor Will's Almanack for 1774* contained a liquid remedy for decayed teeth, a receipt "to clean the teeth and gums, and make the flesh grow close to the root of the enamel," and another remedy for sore gums and loose teeth.

Guerra, Francisco. Yale University School of Medicine, New Haven, Conn. Medical almanacs of the American colonial period. *J. History of Med.* 16:234-255 July 1961

## Miscellaneous

### Visual aids in scientific lectures

Too many professional men are speaking from prepared papers, and consequently are boring their audiences and making it difficult for the audience to understand what is being presented. The lecturer on a scientific subject should avail himself of audio-visual aids—lantern slides, strip films, movie films, posters and the use of a black-board.

It has been found that the use of visual aids results in a gain of about 25 to 35 per cent in factual information presented by a lecturer. Retention of this information is improved about 35 per cent with visual aids.

If a lecturer decides to avail himself of slides, all the slides should be prepared in a professional manner. Most slides should be on the screen for less than a minute; thus, each slide should contain only material that can be absorbed readily in that time.

Graphs should be simple, not complex. The lecturer must sum up a table of figures and present an interesting point. He can illustrate his points with a simple colored line, a cartoon or analogous picture. Ready-made cellophane tapes of various widths and designs can be purchased to make bar graphs.

No more than eight printed lines should be placed on any data slide, and these should fill the entire field. A lesser number of lines is preferable.

If photographs of patients are used, only the essential areas should be shown. The subject should be arranged in anatomic position if possible. A pleasing, plain background of good contrast to the subject should be used. The subject should be illuminated to delineate the necessary structures.

Transparent water colors can be applied to black-and-white lantern slides to make lines or symbols stand out.

Roentgenograms can be made more glamorous by making black-and-white prints of the pertinent points of the film, and drawing a cartoon on the black-and-white positive print.



Kodachrome slides can have symbols, arrows, lines or cartoons superimposed on them so that the drawing will appear to be part of the original Kodachrome.

The lecturer can bind his own slides. The film is removed from the cardboard mounts and brushed lightly with a large camel's-hair brush. The films then are placed in silver masks. Glass slides are placed on either side and the edges are taped with a pressure-sensitive binding tape.

A little imagination and a small expenditure of time and effort in preparing visual aids will yield large dividends in helping audiences to understand, absorb and retain the material presented.

Verne, Daniel, and Newhouse, Robert J. Mount Sinai Hospital, Cleveland, Ohio. Importance of visual aids in scientific lectures. *J.Oral Surg.,Anesth.& Hosp.D.Serv.* 19:410-417 Sept. 1961

### Carabelli tubercle in lower molars

The Carabelli tubercle (or cusp) was first described by Georg C. Carabelli, an Austrian dentist, in 1844. This comparatively small tubercle occurs particularly in upper second deciduous molars or in upper first permanent molars as a

variable fifth cusp on their lingual surfaces, usually it is positioned lingual to the mesiolingual cusp.

More than a century passed after Carabelli's report before the same variation occurring in lower molars was reported in the literature. This unusual delay in observing the presence of Carabelli tubercle in lower molars may be explained by the extremely rare incidence of its occurrence which probably is caused by the fact that the morphogenesis of upper molars takes place primarily in a transverse (buccolingual) direction, whereas the morphogenesis of lower molars occurs in a sagittal (anterodistal) direction.

An almost similar distinction can be made in describing the lingual cusps which occasionally occur in anterior teeth. This defect is a morphologic anomaly of the upper teeth which rarely occurs in lower teeth.

The phenomenon of Carabelli tubercle occurring in lower molars, however, is even less frequent than that of lingual cusps in lower anterior teeth.

In contrast to the highly remarkable difference in frequency between the incidence of Carabelli tubercle in upper and lower molars, there exists

Bilateral asymmetric Carabelli tubercles in lower third molars



a high degree of similarity between both phenomena in regard to their morphologic characteristics.

Morphologically, the site of the Carabelli tubercle occurring in lower molars is primarily mesiolingual, although a shift in distal direction has been observed. In its most extensive form, the Carabelli tubercle may cover the entire lingual margin of the crown of lower molars. Its distinct effect on the formation of the roots, however, is exerted in an entirely different direction, involving mainly the lingual region of the mesial root. Continued differentiation in cusp formation may result in the development of a specific linguomesial branch of the root which, as a morphologic complement of Carabelli tubercle, could be termed the "Carabelli radix."

Although predestined to disappear gradually in the future generation of man, at present the Carabelli tubercle occurring in upper molars must be regarded as an essential constituent of their crowns. In lower molars, however, the Carabelli tubercle is an extremely rare phenomenon which lacks any demonstrable functional significance. This tubercle in lower molars may occur unilaterally or bilaterally but not always symmetrically.

De Jonge, Th. E. Odontologic Department, Anatomic-Embryologic Laboratorium, University of Amsterdam, Mauritskade 61, Amsterdam O, The Netherlands. Het tuberculum Carabelli bij de onderkaaksmolares. *Tschr.tandheelk.* 67:743-761 Nov. 1960

### Dentition of the whales (Cetacea)

The whales (*Cetacea*) are an order of mammals. Although whales are exclusively aquatic animals, they do not belong to the class of fish (*Pisces*).

Whales may be subdivided into three suborders: (1) *Archaeoceti* (exclusively fossil); (2) *Mysticeti* (whalebone whales), and (3) *Odontoceti* (toothed whales).

In most whale species, the two halves of the lower jaw are greatly arched in an outward direction, forming an enormous oral cavity.

The extinct *Archaeoceti* had a unique dentition consisting of 3 incisors, 1 canine, 4 premolars and 3 (or 2) molars in each side of each jaw. The initially erupted 4 or 5 teeth were conical and single-rooted, whereas the later erupting teeth were double-rooted and had serrated crowns. In some species, a deciduous dentition was found.

The *Mysticeti* show no dentition in the adult animal, whereas numerous vestibular positioned deciduous teeth were found in the embryo. The lower jaw is extremely large, its halves curved and loosely fused anteriorly. The upper jaw does not cover the orbital plates of the frontal bone.

Only the *Odontoceti* have teeth present throughout life. The lower jaw is more or less triangular, its anterior narrow and the two halves are firmly fused. The upper jaw covers the orbital plates of the frontal bone completely. The sperm whale (*Physeter catodon*), belonging to the *Odontoceti*, has from 20 to 26 teeth on each side of the lower jaw. The teeth are enormous in size, each of them up to 4 pounds in weight. They are conical in form. There are about eight pairs of smaller, often malformed upper teeth.

The dolphins (*Delphininae*) have numerous teeth in both jaws. The number of teeth, recorded by zoologists, does not include the undeveloped teeth commonly found in the anterior region of both jaws beneath the gingiva. The teeth (from 40 to 50) have a diameter of about 3 mm. This species of whales should not be confused with the dolphin which are not *Cetacea*.

Although whalebone and sperm oil are the most valuable products for which the whales are hunted commercially, whale teeth are highly valuable as substitutes for ivory.

Müller, Walther. Römerhof, Zurich, Switzerland. Walfischzähne. *Deut.Zahnarztl.* 15:365 June 22, 1961

### 'Schizodontia' and 'synodontia'

According to the terminology proposed by the author, schizodontia describes the condition in which a single tooth anlage has divided during the period of tooth development, forming post-eruptorally a twin tooth with a double crown and a single root and canal. Schizodontia occurs relatively often in the permanent dentition, involving mainly the upper anterior teeth.

Synodontia describes the condition in which two normally separated tooth germs have fused during the early odontogenesis, forming post-eruptorally a twin tooth with one united crown and separated roots and canals. Synodontia occurs more often in the deciduous than in the permanent dentition, involving mainly the lower an-

terior teeth. In synodontia, the dentin of the twin tooth is coextensive.

Both terms proposed appear to describe more completely the specific characteristics of these developmental defects than the previously used terms "gemination" and "fusion" which do not point out the different causative factors, ankylosis or synostosis.

De Jonge, Th. E. Anatomic-Embryologic Laboratory, University of Amsterdam, Mauritskade 61, Amsterdam 0, The Netherlands. *Betrachtungen über die Synodontie*. *Deut. zahnärztl. Zschr.* 16:410-412 March 1, 1961

### Perception of pain

W. K. Livingston (1953) argued against the classical conception that the intensity of pain sensation is always proportional to the stimulus. He proposed instead that pain, like all perceptions, is "subjective, individual and modified by degrees of attention, emotional states and the conditioning influence of past experience." Since that time, investigators have moved still further away from the classical assumptions of specific "pain receptors," "pain pathways" and a "pain center" in the brain, all of which implied that stimulation of a "pain receptor" will invariably produce pain, that the pain will have only one specific quality and that it can vary in intensity.

Pain, it is now held, refers to a category of complex experiences, not to a single sensation produced by a specific stimulus. There is a poverty of language for describing the many different qualities of sensory and affective experience that are simply categorized under the broad heading of "pain." Investigators are aware that in the lower part of the brain, at least, the patterns of impulses produced by painful stimuli travel over multiple pathways going to widespread regions of the brain and not along a single path going to a "pain center." The psychological evidence strongly supports the view of pain as a perceptual experience whose quality and intensity is influenced by the unique history of the individual, by the meaning he gives to the pain-producing situation and by his "state of mind" at the moment. All these factors play a role in determining the patterns of nerve impulses ascending to the brain and traveling within the brain. In this way, pain becomes a function of the whole individual,

including his present thoughts and fears as well as his hopes for the future.

Everyone recognizes the positive aspect of pain. It warns us that something biologically harmful is happening. Persons born without the ability to feel pain sustain extensive burns and bruises during childhood, frequently bite deep into their tongues while chewing food, and learn only with difficulty to avoid inflicting severe wounds on themselves.

In higher species, there is much evidence that pain is not simply a function of the amount of bodily damage alone. Rather, the amount and quality of pain experienced are also determined by previous experiences and how well they are remembered, by the ability to understand the cause of the pain and to grasp its consequences. Even the significance that pain has in the present culture plays an essential role in how man feels and responds to pain.

Dogs reared in isolation endure burns and pin-pricks with little or no evidence of pain. Wounded soldiers respond to their injuries not with feelings of pain but with relief, thankfulness at their escape alive from the battlefield, even with euphoria. Athletes can sustain severe injuries without being aware that they have been hurt. In fact, almost any situation that attracts intense, prolonged attention may diminish or abolish pain perception.

Severe postoperative pain can be relieved in some patients by giving them a placebo in place of morphine or other analgesic agent.

When energy from the environment stimulates the skin, a message is transmitted along nerve bundles to the spinal cord of the central nervous system. Until recently, it was believed that the message, once fed in, was relayed without interference direct to a particular area of the brain cortex; the arrival of the message at this cortical area produced the sensation of pain, touch, warmth or cold, depending entirely on the physical characteristics of the initial stimulus.

Evidence exists that this is only part of the picture. Investigators recently have demonstrated the presence of systems of nerve fibers that run from the higher areas of the brain downward to make connection with the message-carrying nerve pathways in the spinal cord. Electrical activity induced in these higher brain areas is capable of

suppressing or modifying the message; it may never get beyond the lower levels of the central nervous system, or an entirely different message may reach the brain. There no longer is any doubt that these message-modifying fibers exist.

But science still cannot account for the complexity of many pain phenomena, especially bizarre pain syndromes such as the fascinating and terrible phantom-limb pain felt by some amputees.

Patients who have undergone prefrontal lobotomy report that they still have pain but that it does not bother them; frequently they say that they still have the "little" pain, but the "big" pain, the suffering, the anguish are gone.

Melzack, Ronald. Massachusetts Institute of Technology, Boston, Mass. The perception of pain. *Sc.American* 204:2: 41-49 Feb. 1961

### Micrin and the mouthwash mania

A new "oral antiseptic for mouthwash and gargle," Micrin, has been launched by Johnson & Johnson with a \$5,000,000 promotional budget, in a field that has been largely dominated by one product, Listerine. Chances are great that mouthwash sales, which have tripled in a decade, will grow even more.

Micrin, like other antiseptic mouthwashes, is promoted for "normal" mouth care and for preventing multiplication of mouth bacteria, with the implication that this will help correct mouth odor, throat infection, gingival disorders and dental disease. The new mouthwash is said to provide "a whole new concept of mouth and breath care far ahead of any toothpaste or mouthwash." Micrin is a combination of two quaternary ammonium antiseptic agents—a standard product named cetylpyridinium chloride, and a trade-named substance called "Dequalinium." Technical data supplied by the manufacturer indicate that in laboratory tests the combination of the two antiseptics inhibits or destroys certain oral bacteria over a longer period than do other mouthwashes or toothpastes. But the company does not indicate that it made comparable clinical tests with the various products, and offers no convincing proof in either published medical or dental literature that in normal use as a mouthwash or gargle, Micrin stops bad breath, minor sore

throat, dental caries, or gingival irritation.

Although present knowledge of the normal defenses of the mucous membranes of the mouth and throat is rudimentary, there is no doubt they are highly effective in preventing or controlling infectious disease of the mucous membrane and gingiva. The mouth is covered by a mechanically protective epithelial lining, and is constantly flushed by secretions of mucous membranes and salivary glands, which have antibacterial properties of their own. Bacteria in the mouth and throat are regularly swallowed and are killed in the stomach by the acid gastric juices.

No mouthwash has been shown to destroy or inhibit the disease-causing viruses harbored in the lymphoid tissue of mouth and throat. A minor sore throat won't be prevented from becoming major by any mouthwash or gargle. If the sore throat is caused by viruses, no known antiseptic will inhibit the germs at all. If it is caused by bacteria, millions of the organisms will be deep in the tissues of the throat or on the surfaces of the nasal pharynx, far beyond reach of a mouthwash or gargle. Effective treatment of a "strep" throat requires the use of an antibiotic for ten days.

The Micrin advertisements never make it clear just what beneficial effect the product is supposed to have on teeth and gingiva. At present, the most effective method of controlling caries is not the use of a mouthwash or gargle, but controlled fluoridation of the community water supply, the regular use of a toothbrush and dental floss, and periodic care by a dentist. As for periodontal disease, no mouthwash can help significantly in preventing or controlling it. The same statement could be made in relation to halitosis. Mouth debris is far less significant in bad breath than in caries, however, and bad breath is rarely if ever due to the action of any mouth or throat bacteria which might be reduced temporarily by an antiseptic rinse.

Why, if mouthwashes have no significant role in any of the various phases of mouth hygiene, do they sell so well? A recent statement in the trade magazine *Chemical Week* provides a possible clue: "Psychologists and motivational researchers . . . say the deep-seated reason for using a mouthwash is to 'wash away guilt feelings.'"

Consumers Union, Mount Vernon, N.Y. Micrin . . . the new oral antiseptic. *Consumer Rep.* 26:476-478 Aug. 1961

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dental health





## Epidemiology

### Necrotizing ulcerative gingivitis

Of 329 patients with necrotizing ulcerative gingivitis, seen at the Municipal Dental Institute in Buenos Aires from 1946 to 1957, 295 (89.7 per cent) were men and 34 (10.3 per cent) were women. Generally, this condition appears in persons who lead an irregular life and are inveterate smokers.

Almost half of the patients were men in the third decade of life. The youngest patient was 9 years old and the oldest was 59 years old. Seventy-nine per cent of the patients were in the group 19 to 33 years old.

No significant seasonal variations in the incidence of the disease were found.

Lado, Roberto A., and Carranza, Fermin A. Instituto Municipal de Odontología de Buenos Aires, Buenos Aires, Argentina. Estudio sobre incidencia de la gingivitis úlceronecrotizante. *Rev.A.odont. Argentina* 49:87-88 March 1961

### Study of cleft lip and cleft palate births in California, 1955

The Division of Dental Health and the Bureau of Records and Statistics of the California State Department of Public Health studied the 1955 California birth certificates mentioning cleft lip or cleft palate, and reached the following conclusions:

1. Of the 313,164 live births in California in 1955, there were 368 infants who had cleft lip or cleft palate. This is a ratio of 1.18 instances per 1,000 births, or 1 per 851 live births.

2. A higher percentage of males than females had cleft lip and palate and cleft lip only. A higher percentage of females had cleft palate only.

3. Of the 368 infants, 92.7 per cent were white, 3.5 per cent were Negro, and 3.8 per cent were members of other races. The percentage of Negro infants with cleft lip or cleft palate was significantly lower than the percentage of total Negro births in the state.

4. The percentage of infants with cleft lip or cleft palate born to mothers 35 years old and over was significantly higher than the percentage of total births to mothers over 35 years old.

5. The percentage of premature births in the cleft lip and cleft palate group far exceeded the percentage of premature births in the total live birth population (19 per cent as against 7 per cent of the total births).

6. Of the 368 infants with cleft lip or cleft palate, 67 had other congenital malformations mentioned on the birth certificate. The 67 had a total of 127 malformations in addition to cleft lip and cleft palate.

7. Fifty-seven of the 368 infants died within the first six months of life; 44 died within the first month. Only six of the deaths were attributed to cleft lip and cleft palate.

Loretz, Wayne; Westmoreland, W. W., and Richards, Lloyd F. California State Department of Public Health, Berkeley, Calif. A study of cleft lip and cleft palate births in California, 1955. *Am.J.Pub.Health* 51:873-877 June 1961

### Crack lines in teeth from husking coconuts

The author, while studying the gingival conditions in the Polynesian inhabitants of the Cook Islands, noted a high incidence of crack lines in the incisors. Of 301 subjects examined, 153 had 519 crack lines in their permanent incisors. A crack line is a break in the continuity of the tooth revealed only by the presence of a visible transverse line.

Of the 519 crack lines, 339 were horizontal (line traversing the tooth was approximately at right angle to its long axis), 167 were oblique (line passed obliquely between the mesial and distal surfaces of tooth), and 13 were proximo-incisal (line so oblique that it passed from either the mesial or distal surface to incisal edge of tooth).

Crack lines in the anterior teeth were confined almost entirely to the incisors. More crack lines were seen in older than in younger children. In each age category there was no significant difference between the sexes in regard to the proportion that had one or more incisors with crack lines. The mean number of upper incisors with crack lines was smaller than the mean number of lower incisors with such lines. The maximum number

of cracks seen in the incisor teeth of any subject was ten. In the subjects six years old and older, 47 per cent of the anterior teeth were free from crack lines; 12 per cent of the subjects had one crack line, 10 per cent had two, 10 per cent had three, 9 per cent had four, 4 per cent had five, and 8 per cent had more than five crack lines.

No correlation was obtained between the oral hygiene of the subjects and the number of teeth with crack lines, or between the mean depth of the gingival sulci on the mesial surfaces of the four incisors of each jaw and the number of crack lines present in these teeth. Only 10 of 453 Australians examined had crack lines in their incisors.

The majority of the crack lines in the incisors of the Polynesians examined almost certainly were produced by the simultaneous application of extraoral and intraoral forces. The practice, common in Rarotonga, of using the incisor teeth in the process of husking coconuts probably is the major etiologic factor in the production of crack lines.

Sutton, Philip R. N. Dental School, University of Melbourne, Melbourne, Australia. Transverse crack lines in permanent incisors of Polynesians. *Austral.D.J.* 6:144-150 June 1961

#### Foot and mouth disease: oral manifestations in man

Foot and mouth disease (aphthous fever, epizootic aphthae or eczema epizootica) is a highly contagious disease affecting practically all cloven-footed animals. The disease is caused by the smallest virus (*Hostis pecoris*) known to infect animals or man.

In the United States and in many European countries, rigid quarantine and immediate destruction of infected animals have limited the disease to isolated outbreaks. The rare instances of human infection usually result from ingestion of meat or dairy products originating from infected animals. In man, the illness starts abruptly with high temperatures, malaise, and a characteristic formation of vesicles on the lips, tongue and other oral tissues after an incubation period varying between 2 and 18 days.

Initially, there is an extreme dryness of the mouth, followed shortly by an excessive salivation and a generalized pruritus.

After several days, secondary large and clear vesicles appear in the oral cavity, the pharynx

and the palms and soles. The facial skin is rarely affected. The lesions of the mucous membrane are painful and soon become shallow ulcers that hemorrhage easily. These oral ulcers often heal spontaneously within two and three weeks, leaving no scar formation.

The causative virus can be isolated in guinea pigs by inoculation into the liquid contents of the oral vesicles. Recently, a complement fixation test has been developed for the early detection of specific serum antibodies in patients with oral manifestation of foot and mouth disease.

The clinical diagnosis of the disease—by a dentist or physician—is complicated by the fact that foot and mouth disease usually coexists with two other vesicular conditions exhibiting similar oral manifestations, (1) vesicular exanthema, and (2) vesicular stomatitis.

The differential diagnosis can be made only after virus isolation and serologic investigation, and three types must be differentiated: (1) infectious aphtha; (2) aphthous stomatitis (acute and recurrent), and (3) habitual (solitary) aphthosis.

Schlosser, Siegfried. Kohlmarkt 11, Vienna 1, Austria. Die Maul- und Klauenseuche und ihre Erscheinungsformen im Munde des Menschen. *Österr.Dentisten Zschr.* 13:102-105 June 1961

#### Periodontal disease in a group of school children in Thailand

Five hundred and sixty-six children of Thai and Chinese nationality ranging in age from 9 to 19 years were the subject of an epidemiological study of periodontal disease in 1960. The children lived in urban areas in southern Thailand. The scoring for oral debris and calculus on which the index of oral hygiene was calculated followed the method of Greene and Vermillion (1960). Russell's system (1956) of classification and scoring was used to calculate the condition of the periodontal structures.

Periodontal disease was prevalent and was slightly more severe in the 11 year old and 17 year old children than recorded by Greene (1960) for similar groups in urban India.

No significant difference in the prevalence of periodontal disease was demonstrated between the Thai and Chinese children, or between boys and girls.

Alveolar bone destruction was observed in varying degree in 13 children.

The relation between the severity of periodontal disease and oral hygiene was close. There was no relation between the presence of periodontal disease and dental caries.

More extensive studies, including dietary patterns, methods of oral hygiene, and involving larger numbers of children, including those from rural areas, would be profitable.

Dental health in these communities would be improved by instruction of the school children in appropriate methods of oral hygiene and the use of the dental staff for removal of supragingival and subgingival calculus.

The methods of Russell and Greene appear satisfactory for determining the extent of periodontal disease and the state of oral hygiene.

Harris, Robert. United Dental Hospital, 2 Chalmers Street, Sydney, N.S.W., Australia. Periodontal disease in a group of school children in Thailand. *Austral.D.J.* 6:151-158 June 1961

#### **Periodontal status of boys 11 to 17 years old in Bombay, India**

The periodontal status of 827 boys, 11 to 17 years old, in Bombay City, 791 boys in the same age group from the Bassein Road rural district in India, and 59 men 19 to 30 years old, was determined. The findings were as follows:

1. Almost 100 per cent of the subjects examined had periodontal disease.
2. Periodontal pockets did not occur to any significant extent before the age of 15 years; however, periodontal pockets or gingival recession apical to the cemento-enamel junction were observed in more than 12 per cent of the boys at the age of 17 years.
3. Periodontal disease increased slowly in severity with increasing age, although gingival inflammation decreased slightly in the middle teens.
4. The amount of calculus increased with age.
5. The amount of bacterial plaques decreased from 11 to 15 or 17 years, after which it increased.
6. There was a direct relation between the amount of calculus and the severity of periodontal disease.

7. The most severe gingival inflammation and pocket formation occurred around the lower incisors and the upper first molars. These teeth also had the highest calculus scores.

8. The lowest periodontal disease index (P.D.I.) score was for the lower first bicuspid.

9. All periodontal disease observed was inflammatory (gingivitis and periodontitis).

Ramford, Sigurd P. University of Michigan School of Dentistry, Ann Arbor, Mich. The periodontal status of boys 11 to 17 years old in Bombay, India. *J.Periodont.* 32:237-248 July 1961

#### **Influence of psychiatric disturbances on the severity of periodontal disease**

An experimental group of 104 male psychiatric outpatients and a control group of 122 male nonpsychiatric outpatients at the clinic of the Veterans Administration West Side Hospital, Chicago, were examined to determine whether a difference in the periodontal status existed between the two groups, and to establish the nature of any differences found. The findings were as follows:

1. The severity of periodontal disease was significantly greater among the psychiatric patients. Significant differences in severity persisted even when such variable factors as degree of calculus, brushing frequency and the habit of bruxism and clenching were held constant in the two groups.
2. Among the psychiatric patients, the severity of periodontal disease increased significantly as the degree of anxiety increased.
3. The severity of periodontal disease increased significantly in both groups of patients as the degree of calculus increased.
4. The severity of periodontal disease decreased in both groups of patients as brushing frequency increased, although the decrease was not statistically significant.
5. The habit of bruxism and clenching was not related to the severity of periodontal disease in either group of patients, although the habit was more common among the psychiatric patients.
6. The severity of periodontal disease decreased significantly in both groups of patients as the educational level increased.

7. Brushing frequency increased significantly in both groups as the educational level increased.

Belting, Charles M., and Gupta, Om P. Veterans Administration West Side Hospital, Chicago, Ill. The influence of psychiatric disturbances on the severity of periodontal disease. *J. Periodont.* 32:219-226 July 1961

## *Caries etiology and control*

### **Knutson's index applied to Formosan, Australian and Indonesian children**

In 1944, J. W. Knutson showed a relation between two measures of the prevalence of dental caries, namely the proportion of children by age with one or more carious (DMF) teeth, and the average number of DMF teeth per child. An equation was derived which enables the average number of DMF teeth per child to be calculated from a knowledge of the proportion of the group with one or more DMF teeth. This equation is expressed as  $K - y = KB^x$ , where  $K$  and  $B$  are constants,  $y$  is the percentage of the group with one or more DMF teeth and  $x$  is the average DMF teeth per child for the group. The values derived by Knutson were  $K = 97$  and  $B = 0.524$ , and the equation using these values was shown to be valid for data from the United States.

An attempt has been made to assess the applicability of the conversion table based on the equation  $97 - y = 97 (0.524)^x$  to data on school children from Australia, Formosa and Indonesia.

Data for the prevalence of dental caries in Australian children are better expressed by an equation which recognizes that up to 100 per cent of the children may be found to have evidence of dental caries ( $K = 100$ ) than by Knutson's equation which takes 97 per cent as the upper limit. However, the Australian data fall within the range of variation found in the United States (Knutson, 1958) and appear to lie between those of Grand Rapids, Mich., before fluoridation and Woonsocket, R. I.

The caries prevalence in Formosa similarly may be better expressed by an equation using  $K = 100$ . However, Knutson's equation was equally

satisfactory when applied to the data for all the Formosan children.

In contrast, the Indonesian data required a lower value ( $K = 93$ ), although Knutson's equation provided equally good estimates of the mean number of DMF teeth up to the age when about 65 per cent of the children have one or more DMF teeth.

The estimated DMF values obtained by using Knutson's equation usually are within 10 per cent of the observed values obtained from full examination, charting, and statistical tabulation, an amount of variation which exists in the findings from examinations in different localities within the United States.

The data presented relate to three different countries, with distinct genetic groups, and with high and low levels of caries prevalence, and strikingly confirm the validity of the general relation described by Knutson between the percentage of children (by age) with one or more DMF teeth and the average number of DMF teeth per child. The data also confirm the usefulness, for public health purposes, of the conversion table derived from his equation.

Lilienthal, B., and Andrews, N. H. University of Melbourne, Parkville N2, Victoria, Australia. The applicability of Knutson's index of prevalence of dental caries to data for Australian, Formosan and Indonesian children. *Arch. Oral Biol.* 3:207-216 April 1961

### **Dental caries and nutrition in Eskimos**

In 1958, oral examinations were given to 713 men of the two scout battalions of the Alaska National Guard. Biochemical determinations of the levels of certain nutrients of the diet were made for most of the men, all Eskimos. The subjects ranged in age from 17 through 54 years and lived in 55 villages or towns throughout Alaska.

Generally, the men seemed to be well nourished and in excellent physical condition. The mean number of DMF teeth was  $8.7 \pm 0.29$ .

The incidence of caries was high in men living in the principal villages and in some of the villages nearby; intermediate in men from relatively remote villages, and very low (mean number of 2.3 DMF teeth) in men from coastal villages in the Kuskokwim-Yukon delta area. In men from the last two groups, however, the incidence of dental caries appeared to be increasing.

Men in the villages with a higher incidence of caries tended to be somewhat taller and heavier, and showed somewhat higher levels of serum carotene and serum vitamin A, and somewhat lower levels of urinary N'methynicotinamide. There were no differences associated with caries incidence in total plasma protein, hemoglobin, ascorbic acid, urinary thiamine or riboflavin.

No fluorosis was seen in any of the men. Fluoride ingestion, hence, seems inadmissible as the reason for the low incidence of caries.

The findings tend to support the earlier conclusion of Siegel, Waugh and Karshan (1940) that relative freedom from caries in the more primitive groups of Eskimos is not due to any nutritional superiority of the traditional diet.

Russell, A. L.; Consolazio, C. Frank, and White, Carl L. National Institute of Dental Research, Bethesda, Md. Dental caries and nutrition in Eskimo scouts of the Alaska National Guard. J.D.Res. 40:594-603 May-June 1961

#### Relation between dental caries and sugar consumption

Nearly all schools in Japan have a school dentist (a local practitioner) who performs dental examinations on all the pupils between April and May every year under the same standards in effect throughout the country. Some primary schools in the central parts of Tokyo have old charts of such dental examinations. The author, using these charts, investigated 7,894 Tokyo pupils (4,084 boys and 3,810 girls) who were born from 1929 to 1951.

The information was correlated with the estimated consumption of sugar per capita per year. In Japan, sugar consumption during World War II decreased to a greater degree than in any European country. The average per capita annual consumption of sugar in Japan ranged from about 15 Kg. in prewar years to 0.2 Kg in 1946. Not until 1952 did per capita consumption of sugar reach prewar levels. The incidence of caries in first molars within a fixed period of time—between 6 and 7 years of age—was designated as the unit of measurement.

The following conclusions were reached:

The annual caries incidence rate of the first molars was high during the years when annual per capita sugar consumption averaged 15 Kg.

When sugar consumption dropped below 10 Kg. per capita per year, the incidence of caries was reduced in a short time. When sugar consumption again increased, the incidence of caries again increased.

Sugar consumed during the period of tooth development appeared to have little influence on the incidence of caries. On the other hand, sugar consumed after the teeth had erupted had a quick effect on the incidence of caries.

Takeuchi, Mitsuharu. Tokyo Dental College, Tokyo, Japan. Epidemiological study on relation between dental caries incidence and sugar consumption. Bul.Tokyo D.Col. 1:58-70 Oct. 1960

#### Index for assessing the efficacy of dental treatment in caries control

A new index, the TI (Treatment Index), has been designed to assess the degree by which dental caries is controlled by treatment. The equation is as follows:

$$\text{Treatment Index} = \frac{3(F/\text{DMF}\%) + 2(\text{FC}/\text{DMF}\%) + (M/\text{DMF}\%)}{3}$$

In the equation, F = a filled tooth, FC = a filled-caries tooth, and M = an extracted tooth. Each of these three grades of successful treatment is weighed according to its relative "degree of success." The weighing is arbitrary, the only criterion being that it should be numerically simple and meaningful. From the equation, it will be seen that if all DMF teeth are filled and otherwise sound, the Treatment Index is 100 per cent, and that if all DMF teeth are extracted, the Treatment Index is 33.3 per cent.

The Treatment Index can be applied to groups of persons or to groups of individual teeth. However, it can be used only on subjects up to 25 years old; beyond that age, the DMF index ceases to be an effective measure of caries prevalence.

When the Treatment Index was applied to 1,863 subjects in Leeds, it was noted that there was a tendency for the index values to increase with age, which is encouraging in view of the fact that as age progresses, more and more teeth are attacked. The index reflected the trend as shown in the other data in that as age progresses,



relatively more teeth are filled and more extracted. In the community studied, it can be stated that some headway is being made in the control of dental caries by treatment, but that this headway is not great.

The Treatment Index was particularly useful in assessing the control of dental caries by treatment in students in several schools, and to demonstrate the variation which can occur from school to school. For 12 year old children in 17 Leeds schools, the Treatment Index values ranged from 27.2 per cent to 55.7 per cent.

The indexes showed that whereas there is little difference between boys and girls in each type of school as to index values, grammar school children have significantly higher index values.

When Treatment Index values for individual groups of teeth were obtained, it was noted that the TI values for incisors, bicuspid and first permanent molars were of the same order, the values being 42.1, 45.3 and 49.2 per cent, respectively. The value for the second permanent molar was 29.5 per cent, this low value being due to the rapidity with which these teeth are attacked, and to their relatively short eruptive life.

Jackson, D. University of Leeds Dental School, Leeds, West Riding, England. An index for assessing the efficacy of dental treatment in the control of dental caries. D.Practitioner 11:226-229 March 1961

### Prenatal exposure to fluorine

On the basis of available clinical evidence, it cannot be claimed that the prenatal administration of fluorine in the form of pills will make the teeth of the baby resistant to caries.

Although the placenta allows the passage of fluorine to the fetus, it seems, within limits, to protect the unborn child against adverse effects of fluorine. Thus, mottling of the enamel does not occur in the deciduous teeth which are undergoing formation prenatally, whereas the permanent teeth, which are calcified almost entirely after birth, do show mottling in a large percentage of children when the water supply contains more than 2 ppm of fluorine, that is, more than twice the optimum amount.

Although the fluorine levels in cord blood seem to parallel those of the mouth, it has not been

established that prenatal fluorine reduces dental caries.

It is uncertain exactly when fluorine (fluoride ion) in the drinking water exerts its greatest protective effect against dental caries. Accumulating evidence indicates that the greatest protection probably is given in the last stages of tooth calcification or at the time of tooth eruption, and to a lesser degree thereafter.

A more rational form of fluorine therapy than prenatal exposure to fluorine, when there is no fluorine in the local drinking water, is to begin administration of fluorine just prior to tooth eruption. To get full and continuing benefits, the fluorine should be used either in solution or in the form of a lozenge to be sucked so that it will react with the surface of the enamel where, by reducing surface solubility, it will supplement any effects conferred during tooth formation.

Bibby, B. G. 800 Main Street, Rochester, N.Y. Prenatal exposure to fluorine. J.A.M.A. 176:831 June 3, 1961

### Fluoridation in Canada, 1961

In Canada, almost four times as many persons are drinking fluoridated water today as five years ago; the population affected by fluoridation has increased by 980,000. Among the larger municipalities now fluoridating water are the following: Nova Scotia: Halifax, 110,000 population; Ontario: Brantford, 53,616; Oshawa, 60,135, and Sudbury, 77,356; Manitoba: Greater Winnipeg, 460,000; Saskatchewan: Saskatoon, 82,817.

Fifteen more municipalities began fluoridating their water supplies during 1960. Five of these municipalities are in Saskatchewan. Of the five, all but Prince Albert initiated the measure by council action. A vigorous contest preceded the Prince Albert plebiscite. The result was favorable to fluoridation by a majority of about 250 votes. In addition, Estevan and Rouleau have voted in favor of fluoridation, but their plants are not yet in operation.

In Manitoba, four communities with a combined population of 14,700 were added to the list of fluoridating municipalities. No plebiscites were held in these municipalities.

British Columbia has three municipalities fluoridating their water and Alberta has one. In

British Columbia, three plebiscites were held in December 1960; none of the three was successful. Quebec has two more fluoridated communities this year.

The Ontario Fluoridation Investigating Committee tabled its report on February 21, 1961. The committee gave complete support to fluoridation and recommended that legislation be enacted to enable municipalities to fluoridate their water without holding plebiscites.

Bureau of Economic Research, Canadian Dental Association. 234 St. George Street, Toronto 5, Ontario, Canada. Fluoridation in Canada, 1961. J.Canad.D.A. 27:318-320 May 1961

### **'Circular' carious lesions in deciduous anterior teeth\***

Since the end of World War II, the incidence of caries in the teeth of German children has increased, probably because the children consume far more sugar and various sweets than they did during the "hungry" war years.

A survey of the incidence of caries in 10,388 pupils of the kindergartens in Essen, carried out in 1958 and 1959, revealed that 51.5 per cent of the children between three and five years old had severe carious lesions; 48.5 per cent of the children were either free from caries or showed only isolated and comparatively mild carious lesions.

A characteristic type of lesion (termed "circular" caries) was observed, appearing mainly in the deciduous anterior teeth in 15 per cent of the children surveyed. The damaging effects of this type of caries were evaluated in children six to nine years old, who showed a premature destruction of the deciduous dentition and disturbances in growth and development of the permanent dentition associated with underdevelopment and atrophy of the jaws. The main complications arising from circular caries are malposition of the teeth and pathologic bite conditions.

The causative factors of circular caries are identical with those of other types of caries, mainly malnutrition of mother and infant, diseases of the mother during pregnancy or of the infant during the suckling period, and the increase in the consumption of foodstuffs containing sugars in the form of monosaccharides or disaccharides, or of pastries made of refined wheat

flour. The intake of great amounts of pastries seems to be particularly characteristic for the development of circular caries. The continued effect of sweet carbohydrates of various kinds, especially sugary nipples, caramels and taffies, on the anterior teeth seems to be the main causative factor.

E. Harndt (1949, 1950 and 1955) assumed that circular caries always develops primarily along the neonatal lines in enamel and dentin. These lines, corresponding to the surface of the teeth at the time of birth, probably are caused by birth traumas or metabolic disturbances. These neonatal lines, and therefore the beginning circular lesions, progress cervicolingually because the postnatal enamel provides less resistance than the intra-uterine enamel.

In 1,500 children kept on a diet almost free from sweet carbohydrates, no instance of circular caries was observed. Eating sugar or sweets between meals or before going to bed seems, therefore, to be the most important factor in promoting circular caries.

Circular caries differs from the so-called "confectioner's" caries in that the latter begins at the gingival margins and always is associated with chronic gingivitis.

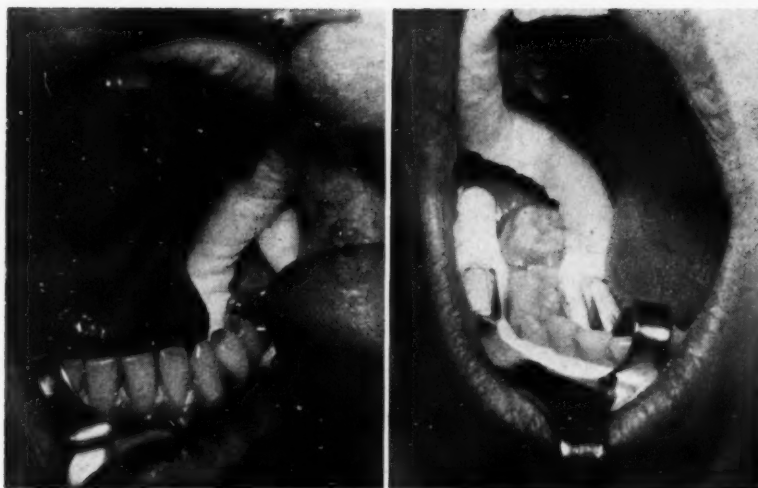
The prognosis of circular caries, despite treatment, is unfavorable. Proximal lesions can be treated routinely, sparing as much tooth structure as possible. In instances of extreme spreading of the lesions, however, selective grinding of the proximal surfaces is indicated. Premature extraction of the deciduous teeth, usually requested by the parents, is contraindicated because it may lead to malposition of the erupting permanent teeth. Many anomalies of the permanent teeth are traceable either to premature or delayed extraction of the carious deciduous teeth.

Hülsmann, Hans, and Eiardt, Walther Sigurd. Board of Health, Hülsmannstrasse 48, Essen-Borbeck, Germany. Die Frontzahnkaries im Milchgebiss unter besonderer Berücksichtigung der zirkulären Karies. Deut.zahnärztl.Zschr. 15:1390-1395 Oct. 15, 1961

### **Technic of applying stannous fluoride topically to teeth**

A thorough oral prophylaxis must be completed before stannous fluoride is applied topically to the teeth. The proximal surfaces of the teeth should

Left: Isolation of one half the mouth of adult patient with Garmer cotton roll holders. Right: Isolation of one half the mouth of child patient



be cleaned with sandpaper strips, or cotton dental tape and pumice to remove plaque formations.

The success or failure of the stannous fluoride topical application depends on adequate isolation of the teeth during the application. The teeth should be isolated in such a manner that the saliva will not contaminate the solution applied to the teeth. The teeth must be perfectly dry before the solution is applied. If, during the application, saliva contacts the area, the application must be started over.

Factors which determine how many teeth should be isolated for treatment include (1) degree of salivation, (2) size of the mouth, (3) ability to open the mouth, (4) muscle tonicity, and (5) levels of frenum attachments. With most patients, the Garmer cotton roll holder with a six inch cotton roll on the lingual side folded over the retromolar pad around to the labial surfaces of the maxillary teeth will provide sufficient isolation to treat half the mouth. The illustration shows the isolation achieved on the adult and the child patient.

The solution should be prepared fresh for each patient. Fifty-gram bottles of the stannous fluoride crystals are available with a double-ended spatula for measuring either an 8 per cent solution for children or a 10 per cent solution for adults. The crystals are dissolved in 10 cc. of distilled sterile water. No flavoring or coloring agent should be added. The solution can be mixed in a measured glass bottle and placed in a disposable paper cup. The patient should be warned of the

unpleasant, astringent taste of the solution to preclude possible gagging during the application, and should be informed that if any of the solution is ingested it will not harm him.

The solution is applied to the dry isolated teeth with a cotton tip applicator for four minutes, at intervals of about 15 to 30 seconds. The patient is permitted to rinse the mouth once between each application to one half of the mouth. The patient is instructed not to eat, drink or rinse for the next half hour.

Some dentists instruct patients to take an anti-sialogogue—such as methantheline bromide, 50 mg.—a half hour before the dental appointment, to reduce salivary flow and reduce the possibility of contaminating the solution on the teeth during the topical application.

Sproul, James Fred. 2658 Oberlin Road, Raleigh, N.C.  
Clinical consideration of stannous fluoride. J.N.Carolina D.Soc.  
44:195-200 April 1961

### Fluoride in salt from sea water

It is said that persons in the Middle East attribute their good teeth to taking salt in their diet in the form of salt from evaporated sea water. The composition of sea water suggests that salt evaporated from such water will contain about 40 ppm of fluorine (fluoride ion). It would be expected, therefore, that at least 30 Gm. of evaporated sea-water salt would have to be consumed daily to provide an optimal supplement of fluorides for adults, assuming some loss during

cooking. Statistics from Switzerland suggest that the average intake of domestic cooking salt, not including salt in bread, manufactured soups, and so forth, is about 5 Gm. per day for adults. Allowing for the hot, dry climate of much of the Middle East, and a decreased use of manufactured foods compared with the use in Europe, the fluorine intake in salt may provide a small but not necessarily insignificant addition toward an optimal intake of fluorine, especially if much fish is eaten. Probably, however, the relative lack of refined foods, and less eating between meals, in the Middle East is largely responsible for the lower incidence of caries.

The controlled incorporation of fluorine at a level of 100 ppm in cooking salt has been advocated in Sweden and now is used in some parts of Switzerland, but usually provides only about one-third of the optimal supplement of fluorine.

Tavistock Square, London W.C.1, England. Fluoride in sea-water salt. *Brit.M.J.* No. 5242:1843-1844 June 24, 1961

### Fluorine supplement for infants

Although fluoridation of the community water supply is the best way of providing dietary fluorine (fluoride ion), in areas where water fluoridation is not feasible, fluoride supplements are considered to be of value. Since the consumption of fluoridated water by infants has been established as being safe, the present recommendation for infants below the age of two years is to prepare water containing about 1 ppm of fluorine rather than to administer a definite or fixed amount of fluoride. Water prepared by adding 1 mg. of fluoride ion to one quart of water is used for drinking purposes and for the preparation of formulas and other food; 1 mg. of fluoride ion has been accepted as the optimum amount of fluoride to be taken daily by children three years old and older, and 0.5 mg. of fluoride ion per day or 1 mg. every other day has been given to infants between two and three years old.

Studies now in progress may provide a better basis for recommending daily allowances of fluorine for infants.

Hendershot, Leland C. 222 East Superior Street, Chicago 11, Ill. Prevention of caries. *J.A.M.A.* 176:1132 July 1, 1961

### Distribution of caries in hamsters

A series of experiments was performed to study the effects of calcium, phosphate, and tooth-brushing on dental caries in hamsters. The subjects consisted of 1,771 animals distributed in 75 animal groups. The experimental conditions were equal for animals belonging to the same group.

The general statistical characteristics in the 75 groups of animals were studied. In each animal group the arithmetic mean and the standard deviation were calculated. It was found:

1. There was a proportionality between the arithmetic mean and the standard deviation in the various animal groups.

2. Among animals within a group there was a skew distribution, with the tail in the direction of the higher caries values.

3. A logarithmic transformation of the original caries data gave a distribution showing a good agreement with the normal distribution.

4. The logarithmic transformation of caries data should be considered an appropriate procedure to perform before the application of analysis of variance.

5. The geometric mean should be considered the most valid estimation of the central value of a caries distribution.

6. The distribution of caries in some groups of human subjects was studied. It seems likely that human caries data also are lognormally distributed. (A distribution characterized by the fact that its logarithm values are normally distributed is called a logarithmic normal or log-normal distribution.)

7. The origin of the lognormal distribution of caries data may be that the increase of caries at a certain moment depends on caries-promoting factors as well as on the extent of caries destruction at that moment.

8. The effects on dental caries of various factors seem to be for the most part multiplicative. Thus, it is appropriate to present the effect of a factor as a percentage increase or a percentage decrease of caries.

Strålfors, Allan. Royal School of Dentistry, Umeå, Sweden. The distribution of caries in hamsters. *Odont.Rev* 12:25-38 March 1961 [in English]

# dental patents

Following are recent patents relating to dentistry granted by the U.S. Patent Office:

December 13, 1960

2,963,786 Charles C. Browning  
Dental partial impression tray

May 2, 1961

2,982,024 William C. Thompson  
Stress eliminator for partial dentures

2,982,025 Harry L. Page, assignor to Transograph Incorporated  
Dental instrument

May 9, 1961

2,983,046 Harvey Jenkins  
Dental appliance

2,983,047 Francis George Moulds, assignor to Kerr Manufacturing Company  
High velocity tool unit for dental engines

2,983,591 Martin Staunt  
Chucks for dental handpieces

May 16, 1961

2,984,008 Alexander Weisberg  
Air and water control for dental drill

2,984,009 Angelo Codoni  
Mouth mirrors

May 23, 1961

2,984,909 Reece W. Johnston  
Dental apparatus

2,985,167 Meyer Colb  
Gum massaging device

2,985,226 John A. Maurer, Victor R. Ferguson

and Clarence G. Taylor, assignors to The Weber Dental Mfg. Co.

Arm rest construction

2,985,228 Sanford S. Golden  
Chair construction

May 30, 1961

2,985,961 Jacob D. Schwartz  
Trial denture base plates

2,985,962 Robert L. Shiner  
Orthodontia appliance tool

190,423 (Design patent) Boyd E. Parker, assignor to George E. Parker Company  
Dental chair

July 4, 1961

2,990,616 Lewis Balamuth and Arthur Kuris, assignors to Cavitron Corp.  
Ultrasonic cutting tool

2,991,299 Maynard Thayer Ivison, assignor to Union Cable Corp.  
Tooth paste composition

July 25, 1961

2,993,220 Rufus S. Nix and James B. McCahle  
Toothbrush and gum massager

2,993,276 Bernard Jankelson  
Dental detector paste and its method of use

August 1, 1961

2,994,129 Paul H. Tanner and Oscar P. Nagel  
High-speed dental handpiece

August 8, 1961

2,994,957 Clarion B. McLeod, assignor to Smith and McLeod Dental Laboratories  
Intra-oral tracer having a scribe for indicating vertical position of dentures

2,994,965 Adolph V. Tuhy  
Dental film drier

August 15, 1961

191,110 (Design patent) Bernard Weissman  
Dental articulator



## dissertations

Relationship of enamel hypoplasia and trauma in repaired cleft lip and palate. *John R. Mink*. 1961. M.S.D. *Indiana University*.

An electromyographic study of the orbicularis oris muscle of cerebral palsied spastic hemiplegics. *Robert R. Buckley, Jr.* 1961. M.S.D. *Indiana University*.

Bridge soldering procedures (a 20-minute sound and color film). *T. E. Ritze*. 1961. M.S. *State University of Iowa*.

The changes of contour which occur during the repair of heat-cured and self-cured maxillary dentures. *David H. Anthony*. 1961. M.S. *University of Michigan*.

A cephalometric analysis of the effect of thumb-sucking and associated neuromuscular habits on the craniofacial skeleton and the dentition. *Eli V. Berger*. 1961. M.S. *University of Michigan*.

The radicular surfaces of teeth following the use of curettes, hoes and files. *Stephen T. Braum*. 1961. M.S. *University of Michigan*.

Natural esthetics in denture construction. *Albert J. Colman*. 1961. M.S. *University of Michigan*.

The effect of the gold oxidation process in the porcelain fused to gold bond. *Frederic Custer*. 1961. M.S. *University of Michigan*.

An electromyographic and functional evaluation of treated orthodontic cases. *Willis B. Eggleston, Jr., and James W. Ekleberry*. 1961. M.S. *University of Michigan*.

Factors determining the prosthetic diagnosis and methods of correcting prognathic and retrognathic mandibles. *Roy T. Hawkinson*. 1961. M.S. *University of Michigan*.

Multiunit bridge casting utilizing the water added hygroscopic investing technic. *Robert E. Lorey*. 1961. M.S. *University of Michigan*.

A clinical and histological study of the gingival tissues before and after scaling the teeth. *James Y. O'Bannon*. 1961. M.S. *University of Michigan*.

The stainless steel endodontic file—its use in obturation of difficult root canals. *Adrian J. Sampeck*. 1961. M.S. *University of Michigan*.

A cephalometric comparison of growth of the complete unilateral cleft palate and normal individual. *James P. Shehan*. 1961. M.S. *University of Michigan*.

A longitudinal cephalometric evaluation of the mandibular dental arch between 8 and 16 years. *H. Peter Witzky*. 1961. M.S. *University of Michigan*.

A study of the effect of annealing temperature of gold foil on the surface hardness and handling characteristics. *George Albert Zarb*. 1961. M.S. *University of Michigan*.

Assessment of total effective mandibular ramus height. *Jerry E. Johnson*. 1960. M.S.D. *University of Minnesota*.

The histological study of changes in the tooth and surrounding structures following apicoectomy in dogs. *Gokul Das Ojha*. 1961. M.S. *Loyola University (Chicago)*.

The fate of intraosseous anorganic bone implants in the calvaria of rabbits. *John M. Sachs*. 1961. M.S. *Loyola University (Chicago)*.

An electromyographic study of the masseter and temporal muscles before, during and after orthodontic procedure. Part IV: during anchorage preparation. *Eugene H. Zylinski*. 1961. M.S. *Loyola University (Chicago)*.

Preliminary investigation into the results obtained from the vestibular forix extension operation. *Harry M. Bohannon*. 1961. M.D.S. *University of Pennsylvania*.

Dental anesthesia and vagotonia (Anesthésie dentaire et cholinergie). *Dimitri Elzingre*. 1961. DR.MED.DENT. *University of Bern, Switzerland*.

Dental analgesia and the vegetative nervous system (Zahnärztliche Analgesie und das vegetative Nervensystem). *Max Gubler*. 1961. DR.MED.DENT. *University of Bern, Switzerland*.

Comparison of the effects of various alkaloids and sterol derivatives on the structures of ascites tumors in mice (Vergleich der Wirkungen verschiedener Alkaloide und Sterin Derivate auf Unterlinien des Mäuse-Ascites-Tumors). *René Comps*. 1961. DR.MED.DENT. *University of Heidelberg, Germany*.

Family histories demonstrating the pathogenesis of defects of dentition (Familienuntersuchungen zur Pathogenese der Gebissanomalien). *Gisela Kalb*. 1961. DR.MED.DENT. *University of Heidelberg, Germany*.

Statistical data on the incidence of radicular and follicular cysts of the jaws (Beitrag zur Statistik der radikulären und follikulären Kiefercysten). *Richard Lellig*. 1961. DR.MED.DENT. *University of Heidelberg, Germany*.

Investigations of the chances for success of apicoectomy and apicectomy: a roentgenographic study (Untersuchungen über die Erfolgsaussichten der apikalen Radikaloperationen). *Gert Nolte*. 1961. DR.MED.DENT. *University of Heidelberg, Germany*.

Pathologic alterations in jaws and periodontium associated with lipoid diseases of the salivary glands (Die pathologischen Veränderungen der Kiefer und des Zahnhalteapparates bei Lipoidkrankheiten der Speicheldrüsen). *Eugenia York*. 1961. DR.MED.DENT. *University of Heidelberg, Germany*.

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